CRPL-F89

IONOSPHERIC DATA

ISSUED
JANUARY 1952

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
CENTRAL RADIO PROPAGATION LABORATORY
WASHINGTON, D. C.

CRPL-F89

NATIONAL BUREAU OF STANDARDS
CENTRAL RADIO PROPAGATION LABORATORY
WASHINGTON, D.C.

Issued
24 Jan. 1952

IONOSPHERIC DATA

CONTENTS

	Page
Revised Symbols and Terminology	2
World-Wide Sources of Ionospheric Data	7
Hourly Ionospheric Data at Washington, D. C.	9, 24, 36, 46
Ionospheric Storminess at Washington, D. C.	9, 36
Radio Propagation Quality Figures	9, 37
Observations of the Solar Corona	11, 38
Relative Sunspot Numbers	11, 41
Observations of Solar Flares	12, 43
Indices of Geomagnetic Activity	12, 44
Sudden Ionosphere Disturbances	13, 45
Erratum	13
Tables of Ionospheric Data	14
Graphs of Ionospheric Data	46
Index of Tables and Graphs of Ionospheric Data in CRPL-F89	76

REVISED SYMBOLS AND TERMINOLOGY

Beginning with data reported for January 1952, the symbols and terminology used in this report (CRPL-F series) will conform as far as practicable to those adopted at the Sixth Meeting of the International Radio Consultative Committee (C.C.I.R.) in Geneva, 1951.

The following excerpts are taken from Document No. 626-E, 3 July 1951, Production and Reduction of Ionospheric Data-Standards, Symbols and Conventions.

General Symbols

1.	f	frequency
2.	fo	ordinary-wave critical frequency
3.	fx	extraordinary-wave critical frequency
4.	fz	critical frequency corresponding to the lowest frequency branch of an h'f trace (see 13 below) showing triple splitting
5.	h'	virtual height (frequently prefixed to the designation of a layer to denote the minimum virtual height, i.e., the virtual height of a point on the trace at which the tangent is horizontal)
6.	hp	a height, derived from a parabolic fit to the "nose" of the curve of electron density distribution with height, and based upon the observed h'f trace for a particular layer, which would represent the height of maximum ionization if the electron density distribution were truly parabolic, and if there were no lower layers present. It is equal to the virtual height measured on the ordinary-wave branch at a frequency equal to 0.834 fo.
7.	yp	the semi-thickness deduced from a parabolic fit to the "nose" of the electron density distribution with height, and based on observed h'f trace for a particular layer
8.	MUF	maximum usable frequency
9.	d-MUF	maximum usable frequency for a path of some specified standard length d
10.	FOT	optimum traffic frequency (formerly optimum working frequency - OWF)
11.	LUF	lowest useful high frequency
12.	Md	maximum usable frequency factor for a path of some specified standard length d
13.	h'f	an observation displaying the virtual height h' as a function of frequency f
14.	h't	an observation displaying the virtual height h' as a function of time for a specified fixed frequency

It is now very nearly universal practice to specify quantities in the above list representing frequencies in megacycles per second, and to specify quantities representing height or distance in kilometers. Exceptions should always be clearly indicated, as for example the use of miles in symbols 9 and 12.

In the table above the abbreviations MUF, FOT, and LUF should be left unaltered in sequence of letters when translated into various languages in order to preserve them as pronounceable words.

Characteristics Most Commonly Observed or Derived from h'f Observations

1. foE
2. foE2
3. foF1
4. foF2

ordinary-wave critical frequency for the E, E2 (see Remark 1), F1, and F2 layers respectively

5. fxE
6. fxE2
7. fxF1
8. fxF2

extraordinary-wave critical frequency for the E, E2, F1, and F2 layers respectively

9. fzE
10. fzE2
11. fzF1
12. fzF2

critical frequency for the lowest frequency branch in the event of triple splitting for the E, E2, F1, and F2 layers respectively

13. fEs — highest frequency on which echoes of the sporadic type are observed from the lower part of the E layer
14. fE2s — highest frequency on which echoes of the sporadic type are observed from the upper part of the E layer; the distinction between the upper and lower parts of the E layer is purely one of apparent virtual height (apparent range of echo) and should be based on station experience; 140 km has been chosen by some stations to represent this distinction
15. fbEs — the lowest frequency at which echoes from the F layer are observed when sporadic echoes from any height in the E layer are of the intense or blanketing type.
16. fmin — that frequency below which no echoes are observed
17. h'E
18. h'E2
19. h'F1
20. h'F2

minimum virtual height on the ordinary-wave branch for the E, E2, F1, and F2 layers respectively

21. h'Es — minimum virtual height of Es echoes (see 13 above)
22. h'E2s — minimum virtual height of E2s echoes (see 14 above)
23. hpF2 — virtual height of the F2 layer measured on the ordinary-wave branch at a frequency equal to 0.834 foF2
24. ypF2 — semi-thickness of the F2 layer deduced from a parabolic fit to the "nose" of the electron density distribution with height, and based on the observed h'f trace
25. E-d-MUF
26. F1-d-MUF
27. F2-d-MUF

maximum usable frequency for a path of some specified standard length d for transmission by the E, F1, and F2 layers respectively

28. (Md) E
29. (Md) F1
30. (Md) F2

maximum usable frequency factor for a path of some specified standard length d for transmission by the E, F1, and F2 layers respectively

It is now very nearly universal practice to specify quantities in the above list representing frequencies in megacycles per second, and to specify quantities representing height or distance in kilometers. Exceptions should always be clearly indicated, as for example the use of miles in symbols 25 to 30 inclusively.

It should be remarked that all symbols of the above list are to be typeset as typewritten, on a straight line, i.e., superscripts and subscripts are no longer to be used.

Remark 1: In the event that clear stratification is evident below the F1 layer and above the regular E layer, care has to be taken to distinguish among stratification in the normal E layer, existence of an E2 layer, and stratification at the bottom of the F1 layer. As a rough guide, in order to classify a layer as E2, it is thought that with equipment having high resolution, the E2 trace will be isolated in height from the traces of the layers above and below, or that generally it should be situated between virtual heights of 140 and 190 km. Those latter limits are subject to adjustment according to the experience at each station.

Remark 2: Understanding of the processes which give rise to echoes of the sporadic type from the E layer is still largely lacking. There have been cases reported in which sufficient retardation, and also change in echo intensity, has been observed to suggest the possibility of using such symbols as foEs and fxEs. Cases have also been observed of Es echoes at virtual heights above about 140 km. These have been designated as E2s (see 14 above).

Remark 3: In the region of the h'f trace identified with the critical frequency of the F1 layer, it is noted that the tangent to the trace is seldom vertical. It would appear, therefore, that quantities recorded as critical frequencies of the F1 layer must not be regarded in the same way as the critical frequencies of the F2 layer. As a guide for assigning numerical values for foF1, fxF1, and fzF1, it is probably sufficient to require that a horizontal tangent exist to the trace of the higher layer, if present. In cases where there is, nevertheless, no sharp discontinuity or cusp in the h'f trace, guidance should be sought in the multiple traces, if present.

Qualifying Symbols

1.	( )	Individual observed values thus enclosed are considered doubtful. The reason for doubt should be specified by an appropriate descriptive symbol or by a footnote.
2.	[ ] or / /	Individual numerical values thus enclosed represent interpolations rather than observations. The reason for the interpolation should be specified by an appropriate descriptive symbol or by a footnote.
3.	> or D	This symbol when it standards before a number means greater than.
4.	< or E	This symbol when it stands before a number means less than.

In 3 and 4 above, the letters D and E have been chosen for use with a typewriter. They can be easily remembered because of their resemblance in meaning to the symbols D and E given below (the latter always replace a numerical value). High grade observing stations will have relatively little use for these four qualifying symbols. The symbols are nevertheless given in order to encourage the maximum possible salvage of results from imperfect observations.

Note Concerning Interpolation:

In the hourly tabulations of ionospheric characteristics it is considered desirable to replace missing numerical values by interpolated values whenever possible. As a general rule, no missing value should be replaced by an interpolated value if the interpolation must be performed between observed values separated by more than two hours in time. The matter of interpolation is given further attention below.

Descriptive Symbols

A letter symbol from the following list, when used to qualify a numerical value, always stands after the numerical value.

	Symbol	Definition
1.	A	characteristic not measurable because of blanketing by Es or by E2s.
2.	B	characteristic not measurable because of absorption either partial or complete, and probably non-deviative in type.
3.	C	characteristic not observed because of equipment or power failure.
4.	D	characteristic at a frequency higher than the normal upper frequency limit of the equipment (see item 3 of the previous section)
5.	E	characteristic at a frequency lower than the normal lower frequency limit of the equipment (see item 4 of the previous section)
6.	F	spread echoes present
7.	G	a) F2-layer critical frequency equal to or less than F1-layer critical frequency b) no Es (or E2s) echoes observed though regular E (or E2)-layer echoes are present (i.e., a symbol for daytime usage)
8.	H	stratification observed within the layer
9.	J	ordinary-wave characteristic deduced from measured extraordinary-wave characteristic
10.	K	ionospheric disturbance in progress (this is always applied to a series of hourly values, never to an isolated value)
11.	L	a) F1-layer characteristic omitted or doubtful because no definite or abrupt change in slope of the h'f curve is observed either for the first reflection or any of the multiples (Remark 3 above applies.) b) h'F2 omitted because the F2-layer trace is continuous with the F1-layer trace and without a point of zero slope
12.	M	characteristic not observed because of some failure or omission on the part of the operator, rather than owing to any mechanical or electrical fault in the equipment or its power supply
13.	N	nature of the record is such that the characteristic cannot readily be interpreted
14.	P	trace extrapolated to critical frequency (it is unnecessary to use this letter for small extrapolations of one or two per cent, but use should be made of symbol 3 of the previous section if the extrapolation leads to a critical frequency which exceeds the last observed point on the trace by more than five per cent)

15. Q distinct layer not present (this symbol is intended to apply to daytime layers only and should be used in the hour columns at the beginning and end of the daylight period to fill empty spaces in those columns where one or more numerical values exist - it should not be used in hour columns where no numerical values exist because of darkness - these columns may be left blank)
16. S characteristic obscured by interference or by atmospherics
17. T loss or destruction of successful observations.
18. U hp or yp not measurable, for instance, because ordinary-wave trace has horizontal tangent at or above the frequency .834 fo.
19. V trace forked near critical frequency.
20. W characteristic at a virtual height greater than the normal upper height limit of the equipment
21. Y Es (or E2s) trace intermittent in frequency range - very short pieces of trace at the high-frequency end should be ignored since they may be presumed to be due to short-lived echoes
22. Z third magneto-ionic component of the h'f trace is observed.

For nearly all purposes enough symbols have been provided to make it unnecessary to leave any blank spaces in the monthly tabulations of hourly values. In the event that no symbol should be found to be entirely satisfactory, a suitable footnote should be given. Blank spaces in the tabulation sheets will therefore be taken to indicate that no observation was scheduled at the given hour (note the exception contained in 15 above).

It should be noted that many occasions will arise when more than one letter symbol is appropriate to describe the circumstances of a particular observation. In these cases, the most important symbol should be placed first. The use of more than one symbol should be held to a minimum.

Notes on the Use of the Descriptive Symbols:

1. The following descriptive symbols are used only in place of an observed numerical value:

C, D, E, G, M, N, Q, T, U and W.

2. The following descriptive symbols may be used either in place of, or to qualify, an observed numerical value:

A, B, F, L and S.

3. The following descriptive symbols may be used only to qualify an observed numerical value:

H, J, K, P, V, Y and Z.

4. Certain of the descriptive symbols when used in place of an observed numerical value have the same force as an actual number when medians are taken, and should therefore be included in the median count in the manner made appro-

priate by their definitions. It should be noted, however, that if half or more of the observations are represented by these symbols, it may be found that the median can only be indicated as greater than or less than the numerical value of the limitation represented. These symbols are:

D, E, G and when it replaces a height characteristic, W.

5. When an observed numerical value has been replaced with certain of the descriptive symbols, it is frequently permissible to enter an interpolated value (see discussion of interpolation practice above). Such symbols, when they qualify the interpolated value, are:

A, B, C, F, L, M, N, S, T and U.

6. When an observed numerical value is indicated as doubtful by the use of parentheses, the reason for doubt should always be indicated. The following descriptive symbols are often used to provide the explanation:

A, B, F, H, J, K, L, P and S.

WORLD-WIDE SOURCES OF IONOSPHERIC DATA

The ionospheric data given here in tables 1 to 60 and figures 1 to 120 were assembled by the Central Radio Propagation Laboratory for analysis and correlation, incidental to CRPL prediction of radio propagation conditions. The data are median values unless otherwise indicated. The following are the sources of the data in this issue:

Republica Argentina, Ministerio de Marina:
Buenos Aires, Argentina

Commonwealth of Australia, Ionospheric Prediction Service of the Commonwealth Observatory:
Brisbane, Australia
Canberra, Australia
Hobart, Tasmania
Townsville, Australia

Australian Department of Supply and Shipping, Bureau of Mineral Resources, Geology and Geophysics:
Watheroo, Western Australia

University of Graz:
Graz, Austria

British Department of Scientific and Industrial Research, Radio Research Board:
Falkland Is.
Fraserburg, Scotland
Singapore, British Malaya
Slough, England

Defence Research Board, Canada:
- Fort Chimo, Canada
- Ottawa, Canada
- Prince Rupert, Canada
- Resolute Bay, Canada
- St. John's, Newfoundland
- Winnipeg, Canada

Radio Wave Research Laboratories, National Taiman University, Taipeh, Formosa, China:
- Formosa, China

National Laboratory of Radio-Electricity (French Ionospheric Bureau):
- Domont, France
- Poitiers, France
- Terre Adelie

Institute for Ionospheric Research, Lindau Uber Northeim, Hannover, Germany:
- Lindau/Harz, Germany

The Royal Netherlands Meteorological Institute:
- De Bilt, Holland

Icelandic Post and Telegraph Administration:
- Reykjavik, Iceland

Radio Regulatory Commission, Tokyo, Japan:
- Akita, Japan
- Tokyo (Kokubunji), Japan
- Wakkanai, Japan
- Yamagawa, Japan

Christchurch Geophysical Observatory, New Zealand Department of Scientific and Industrial Research:
- Christchurch, New Zealand
- Rarotonga, Cook Is.

Norwegian Defense Research Establishment, Kjeller per Lillestrom, Norway:
- Oslo, Norway
- Tromso, Norway

South African Council for Scientific and Industrial Research:
- Capetown, Union of South Africa
- Johannesburg, Union of South Africa

Post, Telephone and Telegraph Administration, Berne, Switzerland:
- Schwarzenburg, Switzerland

National Bureau of Standards (Central Radio Propagation Laboratory):
- Anchorage, Alaska
- Fairbanks, Alaska
- Maui, Hawaii
- Narsarssuak, Greenland
- Puerto Rico, West Indies
- San Francisco, California (Stanford University)
- Washington, D. C.

HOURLY IONOSPHERIC DATA AT WASHINGTON, D. C.

The data given in tables 61 to 72 follow the scaling practices given in the report IRPL-C61, "Report of International Radio Propagation Conference," pages 36 to 39, and the median values are determined by the conventions given above under "Symbols, Terminology, Conventions." Beginning with September 1949, the data are taken at Ft. Belvoir, Virginia.

IONOSPHERIC STORMINESS AT WASHINGTON, D.C.

Table 73 presents ionosphere character figures for Washington, D. C., during December 1951, as determined by the criteria given in the report IRPL-R5, "Criteria for Ionospheric Storminess," together with Cheltenham, Maryland, geomagnetic K-figures, which are usually covariant with them.

RADIO PROPAGATION QUALITY FIGURES

Table 74 gives provisional radio propagation quality figures for the North Atlantic and North Pacific areas, for 01 to 12 and 13 to 24 GCT, November 1951., compared with the CRPL daily radio disturbance warnings, which are primarily for the North Atlantic paths, the CRPL weekly radio propagation forecasts of probable disturbed periods, and the half-day Cheltenham, Maryland, geomagnetic K-figures.

The radio propagation quality figures are prepared from radio traffic and ionospheric data reported to the CRPL, in a manner basically the same as that described in IRPL-R31, "North Atlantic Radio Propagation Disturbances, October 1943 through October 1945," issued February 1, 1946. The scale conversions for each report are revised for use with the data beginning January 1948, and statistical weighting replaces what was, in effect, subjective weighting. Separate master distribution curves of the type described in IRPL-R31 were derived for the part of 1946 covered by each report; data received only since 1946 are compared with the master curve for the period of the available data. A report whose distribution is the same as the master is thereby converted linearly to the Q-figure scale. Each report is given a statistical weight which is the reciprocal of the departure from linearity. The half-daily radio propagation quality figure, beginning January 1948, is the weighted mean of the reports received for that period.

These radio propagation quality figures give a consensus of opinion of actual radio propagation conditions as reported by the half day over the two general areas. It should be borne in mind, however, that though the quality may be disturbed according to the CRPL scale, the cause of the disturbance is not necessarily known. There are many variables that must be considered. In addition to ionospheric storminess itself as the cause, conditions may be reported as disturbed because of seasonal characteristics such as are particularly evident in the pronounced day and night contrast over North Pacific paths during the winter months, or because of improper frequency usage for the path and time of day in question. Insofar as possible, frequency usage is included in rating the reports. Where the actual frequency is not shown in the report to the CRPL, it has been assumed that the report is made on the use of optimum working frequencies for the path and time of day in question. Since there is a possibility that all disturbance shown by the quality figures is not due to ionospheric storminess alone, care should be taken in using the quality figures in research correlations with solar, auroral, geomagnetic, or other data. Nevertheless, these quality figures do reflect a consensus of opinion of actual radio propagation conditions as found on any one half day in either of the two general areas.

Note. The North Pacific quality figures have been marked "low weight" beginning with August 1951. This is not because of any discontinuity in the accuracy of the individual reports on which the figures are based nor in the method of derivation of the indexes. However, since the number of suitable reports available for this work has decreased appreciably during 1950 and 1951, it seems appropriate to emphasize now that the North Pacific quality figures do not have as firm a basis as the North Atlantic quality figures.

OBSERVATIONS OF THE SOLAR CORONA

Tables 75 through 77 give the observations of the solar corona during December 1951 obtained at Climax, Colorado, by the High Altitude Observatory of Harvard University and the University of Colorado. The data are listed separately for east and west limbs at 5-degree intervals of position angle north and south of the Solar Equator at the limb. The time of observation is given to the nearest tenth of a day, GCT.

Table 75 gives the intensities of the green (5303A) line of the emission spectrum of the solar corona; table 76 gives similarly the intensities of the first red (6374A) coronal line; and table 77, the intensities of the second red (6702A) coronal line; all observed at Climax in December 1951.

The following symbols are used in table 75 through 77: a, observation of low weight; -, corona not visible; and X, position angle not included in plate estimates.

Table 78 gives details of the Climax, Colorado, observations from July 1951 through December 1951. The first column lists the Greenwich date of observation; the following columns give the threshold or lowest observable intensity of 5303A for each spectrum plate centered at the astronomical position angle indicated; the last two columns indicate the observer and the person responsible for the intensity estimates of the observation. These tables continue the presentation of coronal data in the manner of table 1 of CRPL-1-4 and appear in the F series regularly at intervals of six months.

RELATIVE SUNSPOT NUMBERS

Table 79 lists the daily provisional Zurich relative sunspot number, R_Z, as communicated by the Swiss Federal Observatory. Table 80 continues the new series of American relative sunspot numbers, R_A'. Beginning with 1951, the observations collected by the Solar Division, AAVSO, have been reduced according to a new procedure, such that only high quality observations of experienced observers are combined into R_A'. Observatory coefficients for each of the 22 selected observers were recomputed on data for 1948-1950, years when there was a wide range of solar activity. Otherwise, the procedure is that outlined in Publication of the Astronomical Society of the Pacific, 61, 13, 1949. The scale of the American numbers in 1951 differs from that of the reports for earlier years because of these changes, and the new series is designated R_A' rather than R_A. The American relative sunspot numbers appear monthly in these pages, as communicated by the Solar Division.

OBSERVATIONS OF SOLAR FLARES

Table 81 gives the preliminary record of solar flares reported to the CRPL. These reports are communicated on a rapid schedule at the sacrifice of detailed accuracy. Definitive and complete records are published later in the Quarterly Bulletin of Solar Activity, I.A.U., in various observatory publications, and elsewhere. The present listing serves to identify and roughly describe the phenomena observed. Details should be sought from the reporting observatory.

Reporting directly to the CRPL are the following observatories: Mt. Wilson, McMath-Hulbert, U. S. Naval, Wendelstein, Kanzel and High Altitude at Sacramento Peak, New Mexico. The remainder report to Meudon (Paris), and the data are taken from the Paris-URSIgram broadcast, monitored fairly regularly by the CRPL. The data on solar flares reported from Sacramento Peak, New Mexico, communicated by the High Altitude Observatory at Boulder, Colorado, are provided by Harvard University as the result of work undertaken on an Air Materiel Command Research and Development Contract administered by the Air Force Cambridge Research Laboratories.

The table lists for each flare the reporting observatory, date, times of beginning and ending of observation, duration (when known), total area (corrected for foreshortening), and heliographic coordinates. For the maximum phase of the flare is given the time, intensity, area relative to the total area, and the importance. The column "SID observed" is to indicate when a sudden ionosphere disturbance, noted elsewhere in these reports, occurred at the time of a flare. Times are in Universal Time (GCT).

INDICES OF GEOMAGNETIC ACTIVITY

Table 82 lists various indices of geomagnetic activity based on data from magnetic observatories widely distributed throughout the world. The indices are: (1) preliminary mean 3-hourly K-indices, Kw; (2) preliminary international character-figures, C; (3) geomagnetic planetary three-hour-range indices, Kp; (4) magnetically selected quiet and disturbed days.

Kw is the arithmetic mean of the K-indices from all reporting observatories for each three hours of the Greenwich day, on a scale 0 (very quiet) to 9 (extremely disturbed). The C-figure is the arithmetic mean of the subjective classification by all observatories of each day's magnetic activity on a scale of 0 (quiet) to 2 (storm). The magnetically quiet and disturbed days are selected by the international scheme outlined on pages 219-227 in the December 1943 issue of Terrestrial Magnetism and Atmospheric Electricity.

Kp is the mean standardized K-index from 11 observatories between geomagnetic latitudes 47 and 63 degrees. The scale is 0 to 9, expressed in thirds of a unit, e.g., 5- is 4 2/3, 5o is 5 0/3, and 5 + is 5 1/3. This planetary index is designed to measure solar particle-radiation by its magnetic effects, specifically to meet the needs of research workers in the ionospheric field. A complete description of Kp has appeared in Bulletin 12b, "Geomagnetic Indices C and K, 1948," published in Washington, D. C., 1949, by the Association of Terrestrial Magnetism and Electricity, International Union of Geodesy and Geophysics. Tables of Kp for 1945-48 are in Bulletin 12b; for 1940-44 and 1949, in these CRPL-F reports, F65-67; for 1950, monthly in F68 and following issues. Current tables are also published quarterly in the Journal of Geophysical Research along with data on sudden commencements (sc) and solar flare effects (sfe).

The Committee on Characterization of Magnetic Disturbance, ATME, IUGG, has kindly supplied this table. The Meteorological Office, De Bilt, Holland, collects the data and compiles Kw, C and selected days. The Chairman of the Committee computes the planetary index.

SUDDEN IONOSPHERE DISTURBANCES

Table 84 lists the sudden ionosphere disturbances observed at Lindau, Harz, Germany, November 1951. No sudden ionosphere disturbances were observed during the month of December 1951 at Washington, D. C.

ERRATUM

CRPL-F88, p. 14, table 4: At 2300 in the h'F2 column, the value should be <350.

TABLES OF IONOSPHERIC DATA

Table 1

Washington, D. C. (38.7°N, 77.1°W) — December 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	280	2.8						2.9
01	(280)	2.8						3.0
02	(280)	3.0						3.0
03	270	3.1						3.0
04	260	3.0						3.0
05	260	3.0						3.0
06	270	2.8						3.0
07	250	3.4						3.1
08	230	5.8	---	---	120	2.0		3.4
09	240	6.5	230	---	120	2.4	2.3	3.4
10	250	7.6	220	---	110	2.7		3.3
11	250	8.9	220	3.9	120	3.0		3.2
12	250	8.8	230	4.0	110	3.0		3.3
13	250	8.6	220	---	110	2.9		3.2
14	250	8.6	230	---	110	2.7		3.2
15	240	9.0	230	---	120	2.4		3.2
16	220	8.4			120	2.0		3.3
17	220	6.9						3.2
18	230	5.8						3.1
19	230	5.0						3.2
20	240	3.6						3.1
21	280	3.0						3.0
22	280	3.0					2.1	2.9
23	280	2.8						3.0

Time: 75.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 2

Tromso, Norway (69.7°N, 19.0°E) — November 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	(350)	4.4					5.5	2.6
01	(355)	(4.7)					5.6	(2.7)
02	(340)	4.4					5.2	2.8
03	330	4.4					5.2	2.8
04	315	4.2					5.5	3.0
05	310	3.6					3.6	3.0
06	295	3.0					3.2	3.0
07	280	2.6					3.2	3.1
08	260	3.1					3.1	3.1
09	240	4.4			---	---	3.0	3.2
10	240	5.2			---	---	3.2	3.4
11	235	5.8	---	---	---	---	3.1	3.4
12	230	5.9	---	---	---	---	3.1	3.4
13	230	5.7			---	---	3.2	3.4
14	230	4.8			---	---	3.2	3.4
15	240	4.6			---	---	3.8	3.1
16	240	4.0					4.4	3.2
17	275	4.2					4.7	3.1
18	(295)	4.4					4.8	3.0
19	(320)	4.3					4.9	(3.0)
20	(340)	4.2					5.3	3.0
21	(345)	(4.6)					5.8	(2.9)
22	---	(4.9)					5.4	(2.6)
23	---	(4.4)					5.4	(2.7)

Time: 15.0°E.
Sweep: 0.6 Mc to 25.0 Mc in 5 minutes, automatic operation.

Table 3

Anchorage, Alaska (61.2°N, 149.9°W) — November 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	---	---					(2.7)	---
01	---	(2.8)					3.4	(2.8)
02	(320)	(2.9)					2.8	(2.7)
03	(330)	(2.9)						(2.7)
04	(320)	(2.9)						(2.8)
05	(310)	(2.9)						(2.7)
06	(300)	(2.8)						(2.8)
07	300	3.0						2.8
08	250	3.8						3.0
09	250	5.0						3.2
10	250	6.0						3.2
11	240	6.6	230	---				3.1
12	230	7.2	---	---				3.2
13	240	7.7	---	---				3.2
14	230	7.6						3.2
15	220	6.9						3.2
16	220	6.2						3.2
17	230	5.0						3.2
18	240	3.7						3.1
19	250	2.3						3.1
20	290	(2.5)						(2.9)
21	---	---					(2.7)	---
22	---	---						---
23	---	---					(3.7)	---

Time: 150.0° W.
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 4

Narsarssuak, Greenland (61.2°N, 45.4°W) — November 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	---	---					4.9	---
01	---	---					3.8	---
02	---	---					4.0	---
03	---	---					4.3	---
04	(380)	(3.4)					4.2	(2.6)
05	(320)	(3.0)					4.2	(2.7)
06	(310)	(2.6)						(2.7)
07	(320)	(2.6)						(2.8)
08	300	4.0						3.0
09	(300)	5.1						3.0
10	(300)	6.0	---	---				3.0
11	300	6.4	---	---				3.0
12	310	6.6	(280)	---	---	---		2.9
13	310	6.3	---	---	---	---		3.0
14	300	(5.8)	---	---	---	---		3.0
15	320	(5.0)			---	---		(2.9)
16	(340)	(4.0)					4.0	(2.7)
17	(320)	(4.0)					4.6	(2.8)
18	(380)	(4.2)					6.2	(2.7)
19	(400)	(4.1)					5.5	(2.6)
20	(420)	(3.8)					4.8	---
21	(370)	---					5.4	---
22	(350)	(3.0)					4.8	---
23	(380)	---					3.9	---

Time: 45.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 5

Oslo, Norway (60.0°N, 11.0°E) — November 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	>380	2.0					2.4	2.8
01	350	1.8					2.7	2.8
02	350	1.7					3.0	2.8
03	310	1.7					3.0	2.8
04	300	1.8					2.5	2.9
05	285	2.0					2.4	3.0
06	275	2.0					2.5	(3.1)
07	275	2.3			---	---		(3.1)
08	235	3.5	---	---	---	E	2.6	3.2
09	225	5.3	235	---	---	1.8	3.2	3.4
10	220	6.3	225	---	110	2.0	3.5	3.4
11	225	6.7	>215	2.8	115	2.3	3.3	3.4
12	225	7.2	220	---	115	2.3	3.5	3.4
13	220	7.3	>215	2.7	125	2.2	3.4	3.4
14	220	7.2	>220	---	130	2.0	3.4	3.4
15	215	6.4	---	---	140	1.8	3.3	3.4
16	215	5.9	---	---	---	E	2.9	3.3
17	220	5.1			---	---		3.4
18	220	4.1						3.3
19	250	3.0						3.2
20	300	2.2						3.1
21	320	2.1						3.0
22	360	2.0						2.9
23	420	1.9					2.5	2.8

Time: 15.0°E.
Sweep: 1.3 Mc to 14.0 Mc in 8 minutes, automatic operation.

Table 6

San Francisco, California (37.4°N, 122.2°W) — November 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	(260)	3.5						3.0
01	240	3.3					2.4	3.0
02	260	3.4						3.0
03	250	3.4					2.2	3.0
04	260	3.4						3.0
05	260	3.5						2.9
06	270	3.5						3.0
07	240	5.4			---	---		3.3
08	230	7.5	---	---	120	2.3	3.3	3.4
09	230	8.1	220	3.5	110	2.7	3.7	3.3
10	240	9.2	210	4.2	110	3.0	3.6	3.3
11	250	9.8	220	4.4	110	3.1	3.4	3.2
12	250	9.9	220	4.3	120	3.2	2.2	3.2
13	250	9.6	230	4.4	120	3.2	2.4	3.2
14	240	9.4	230	4.0	120	3.0	3.6	3.2
15	230	9.4	220	---	120	2.8	2.4	3.3
16	230	8.6			120	2.2	2.2	3.3
17	220	7.2						3.4
18	220	5.4					2.4	3.3
19	220	4.3					2.3	3.4
20	250	2.9					2.7	3.2
21	(240)	2.9					3.5	3.0
22	(260)	3.2					3.5	3.0
23	(260)	3.3					2.6	3.0

Time: 120.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 7

Maui, Hawaii (20.8°N, 156.5°W) — November 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	240	3.5						3.0
01	250	3.6					1.5	3.1
02	240	3.1					1.7	3.1
03	240	2.8					2.4	3.2
04	260	2.3					1.8	2.9
05	310	2.1					1.7	2.6
06	320	2.4					1.7	2.7
07	260	5.6			130	1.8	3.3	3.2
08	(260)	8.3	240	---	120	2.5	4.4	3.2
09	280	9.8	230	---	120	3.0	4.1	3.1
10	270	11.1	220	4.6	110	3.2	6.1	3.1
11	280	12.0	210	(4.7)	110	3.3	5.1	3.0
12	300	12.9	210	(4.9)	110	3.4	4.9	3.0
13	290	13.9	220	4.8	110	3.4	4.7	3.0
14	270	14.2	230	(4.7)	115	3.3	4.3	3.0
15	260	13.5	230	(4.4)	110	3.1	4.7	3.1
16	240	12.4	240	---	110	2.7	4.7	3.2
17	230	10.8	---	---	120	2.1	4.9	3.2
18	220	8.5					3.8	3.4
19	220	6.0					3.4	3.2
20	240	5.0					3.4	2.9
21	240	5.0					2.2	3.0
22	230	5.0						3.1
23	240	3.8					1.9	3.1

Time: 150.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 8

Puerto Rico, W.I. (18.5°N, 67.2°W) — November 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	240	4.4						3.2
01	230	4.3						3.2
02	220	4.1						3.3
03	220	3.8						3.3
04	250	3.3						2.8
05	250	3.2						2.8
06	250	3.4						3.0
07	230	6.3	---	---	120	1.8		3.4
08	230	7.9	220	---	100	2.4		3.4
09	240	8.8	220	---	100	3.0		3.3
10	250	9.8	210	---	100	3.2		3.3
11	260	9.7	210	4.6	100	3.4		3.3
12	260	9.6	210	4.7	100	3.4		3.2
13	260	9.9	200	4.6	100	3.4		3.2
14	250	9.7	210	---	100	3.3		3.2
15	240	9.3	210	---	100	3.1	3.7	3.1
16	240	8.9	220	---	100	2.7	3.5	3.2
17	220	8.4	220	---	110	2.2	3.4	3.3
18	210	7.9					2.8	3.3
19	210	6.3					2.3	3.1
20	230	5.5						3.0
21	250	5.1						3.0
22	240	4.8						3.1
23	240	4.7						3.1

Time: 60.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 9

Fairbanks, Alaska (64.9°N, 147.8°W) — October 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	(420)	(3.0)					4.4	(2.4)
01	(470)	(2.2)					5.1	(2.3)
02	(520)	(3.6)					4.6	(2.3)
03	(500)	(3.9)					5.0	(2.3)
04	(470)	(3.9)					3.4	(2.3)
05	440	(3.7)					3.2	(2.3)
06	(400)	(3.6)						(2.4)
07	350	(4.4)						(2.7)
08	330	(5.1)	---	---				(2.7)
09	330	(5.8)	320	---				(2.7)
10	360	(6.0)	320	---	---	---		(2.7)
11	360	(6.1)	300	---	---	---		(2.6)
12	360	(6.4)	320	---	---	---		(2.6)
13	360	(6.5)	320	---	---	---		(2.7)
14	340	(6.8)	---	---	---	---		(2.6)
15	330	(6.8)			---	---		(2.7)
16	330	(6.5)			---	---		(2.7)
17	320	(6.0)			---	---		(2.7)
18	360	(4.6)			---	---		(2.6)
19	350	(3.7)						(2.7)
20	350	(3.8)					4.5	(2.7)
21	380	(3.1)					4.2	(2.6)
22	(380)	(2.7)					3.8	(2.6)
23	(400)	(2.3)					5.0	---

Time: 150.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 10

Prince Rupert, Canada (54.3°N, 130.3°W) — October 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	2.2					1.5	3.0
01	310	2.1					2.0	3.0
02	355	2.0					2.0	2.8
03	320	2.5					3.5	2.8
04	330	2.8					2.6	2.8
05	325	2.6					2.0	2.8
06	325	2.6			---	---	2.0	3.0
07	300	3.0	---	---	---	1.8	1.7	3.1
08	260	4.6	240	---	125	2.1	2.0	3.3
09	285	5.4	240	3.8	120	2.6		3.2
10	295	6.1	230	4.0	110	2.8		3.2
11	310	6.3	220	4.0	110	2.9		3.0
12	300	6.8	220	4.0	110	3.0		3.2
13	290	7.0	230	4.0	110	2.9		3.2
14	280	7.0	240	4.0	120	2.8		3.2
15	270	7.0	240	3.7	110	2.7		3.3
16	245	6.9	250	---	120	2.4		3.2
17	240	6.7			130	2.2	2.0	3.3
18	230	6.2			---	1.8	1.6	3.2
19	230	5.0					1.5	3.3
20	240	3.9					1.5	3.3
21	265	3.0					1.8	3.3
22	280	2.5					1.5	3.2
23	300	2.0					1.8	3.0

Time: 120.0°W.
Sweep: 0.6 Mc to 20.0 Mc in 15 seconds.

Table 11

De Bilt, Holland (52.1°N, 5.2°E) — October 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	<285	3.0					2.4	2.7
01	280	2.9					2.7	2.8
02	280	(2.9)					2.5	2.8
03	---	(2.7)					2.8	2.8
04	(240)	(2.4)					2.8	3.0
05	(230)	(2.0)					3.4	3.1
06	245	3.4			---	E	2.8	3.2
07	230	4.9	240	---	125	2.1	3.1	3.3
08	240	6.0	220	3.3	110	2.4	3.2	3.3
09	250	6.8	220	4.0	105	2.7	3.9	3.3
10	250	7.1	205	4.1	100	2.8	4.0	3.4
11	250	7.8	205	4.1	100	2.9	3.9	3.3
12	250	7.7	210	4.2	100	2.9	3.9	3.3
13	250	7.8	220	4.0	100	2.9	3.8	3.3
14	240	7.7	225	3.8	100	2.7	3.6	3.3
15	235	7.2	230	---	110	2.4	3.2	3.3
16	230	7.5	---	---	---	2.0	3.2	3.4
17	230	6.8			---	E	2.9	3.3
18	<230	5.8					2.7	3.2
19	<230	4.8					2.3	3.2
20	230	4.0						3.0
21	245	3.3					2.3	2.9
22	(260)	3.1					2.2	2.8
23	(280)	3.0						2.7

Time: 0.0°.
Sweep: 1.4 Mc to 16.0 Mc in 7 minutes, automatic operation.

Table 12

Winnipeg, Canada (49.9°N, 97.4°W) — October 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	2.9					3.0	2.9
01	300	2.6					3.2	2.8
02	320	2.4					3.1	(2.7)
03	320	3.0					3.0	2.7
04	300	2.6					3.4	(2.8)
05	320	2.8					3.2	(2.6)
06	320	2.8					2.7	2.9
07	270	3.4			---	---	2.0	3.1
08	260	5.0	240	---	110	2.4	2.4	3.0
09	290	5.6	220	3.9	120	2.8		3.0
10	280	6.2	220	4.0	120	2.8		3.0
11	290	7.0	220	4.2	120	3.0		3.0
12	290	7.5	220	4.2	120	3.0		3.0
13	290	7.8	230	4.2	120	3.0		2.9
14	280	7.9	230	4.2	120	3.0		2.9
15	280	7.8	240	4.0	120	2.8	2.7	3.0
16	250	7.6	240	---	110	(2.4)	2.4	3.0
17	240	7.1			---	---	2.4	3.0
18	240	7.0					2.4	3.0
19	240	6.0					2.0	3.0
20	240	4.8					1.8	3.0
21	260	3.8					2.0	3.0
22	280	3.5					2.0	3.0
23	290	3.2					2.0	2.9

Time: 90.0°W.
Sweep: 0.6 Mc to 20.0 Mc in 15 seconds.

Table 13

St. John's, Newfoundland (47.6°N, 52.7°W) October 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	3.2					1.7	2.7
01	300	3.2					1.8	2.8
02	280	2.9					1.8	2.8
03	280	2.6					1.6	2.8
04	290	2.3	---	---			2.0	2.9
05	290	2.3	---	---			1.3	2.9
06	260	4.0	---	---	---	1.8	2.0	3.1
07	250	5.7	240	---	120	2.3	2.2	3.2
08	250	6.5	230	3.5	120	2.7		3.2
09	260	7.0	220	4.0	110	2.9		3.2
10	280	7.4	210	4.2	110	3.0		3.1
11	270	8.1	220	4.3	110	3.0		3.1
12	270	8.1	220	4.2	110	3.0		3.1
13	270	8.0	230	4.1	120	3.0		3.1
14	260	7.9	230	3.6	120	2.8		3.1
15	250	8.0	240	3.5	110	2.5		3.1
16	240	7.6	---	---	110	---	2.1	3.1
17	240	7.6			---	---	2.0	3.1
18	240	6.4			---	---	1.6	3.0
19	250	5.4			---	---	1.6	3.0
20	260	5.0			---	---	1.7	2.8
21	280	4.4					1.6	2.8
22	280	4.1					1.7	2.8
23	300	3.7					1.8	2.8

Time: 60.0°W.
Sweep: 0.6 Mc to 20.0 Mc in 15 seconds.

Table 14

Schwarzenburg, Switzerland (46.8°N, 7.3°E) October 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	3.6						
01	300	3.6						
02	305	3.5						
03	300	3.4						
04	300	3.2						
05	260	3.1						
06	260	2.6			---	---		
07	240	4.4	---	---	120	1.8		
08	230	5.8	230	3.4	110	2.2		
09	230	6.9	230	4.0	110	2.8		
10	240	7.4	220	4.3	100	2.8		
11	250	8.2	205	4.4	100	3.0		
12	250	8.1	200	4.4	100	3.0		
13	240	7.9	220	4.4	100	3.0		
14	230	7.6	215	4.3	100	3.0		
15	230	8.0	---	---	105	2.8		
16	235	8.0			110	2.5		
17	230	7.6			120	2.2		
18	230	7.2			---	---		
19	230	6.1			---	---		
20	240	4.8						
21	260	4.4						
22	300	3.8						
23	300	3.8						

Time: 15.0°E.
Sweep: 1.0 Mc to 25.0 Mc in 30 seconds.

Table 15

Ottawa, Canada (45.4°N, 75.7°W) October 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	290	3.4					1.6	2.9
01	300	3.0					1.7	2.9
02	300	2.8					1.8	2.8
03	300	2.7					1.7	2.8
04	290	2.5					1.6	2.8
05	300	2.4					1.6	2.8
06	280	3.0					1.8	2.9
07	240	4.7	---	---	120	2.2	2.2	3.1
08	240	6.0	230	---	120	2.6	2.7	3.2
09	260	6.7	220	3.9	120	3.0	3.1	3.1
10	260	7.4	210	4.2	120	3.0	2.9	3.1
11	260	7.8	200	4.3	120	3.2		3.1
12	270	8.1	210	4.3	110	3.2	2.5	3.0
13	260	8.2	220	4.2	110	3.2	3.4	3.1
14	260	8.1	220	4.1	120	3.0	3.0	3.0
15	250	8.3	230	3.6	120	2.8		3.0
16	240	8.4	240	---	120	2.5	2.6	3.1
17	230	7.7			---	---	2.3	3.1
18	230	7.3					2.0	3.1
19	240	6.0					2.1	3.0
20	240	4.9					1.8	3.0
21	260	4.3					1.7	2.9
22	280	3.8					1.7	2.9
23	290	3.7					1.7	2.9

Time: 75.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 16

Johannesburg, Union of S. Africa (26.2°S, 28.1°E) October 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	270	4.4						2.9
01	260	4.1						2.9
02	250	3.8					1.5	3.0
03	260	3.4					1.6	2.9
04	260	3.3					1.6	2.9
05	270	3.4						2.9
06	240	5.6			120	1.9		3.3
07	250	6.9	230	4.0	110	2.6		3.3
08	270	8.0	220	4.4	110	3.0	3.5	3.2
09	280	8.4	210	4.7	110	3.4		3.1
10	300	9.1	210	4.9	110	3.5		2.9
11	300	9.7	210	5.0	110	3.6		2.9
12	300	10.1	210	5.0	110	3.7		2.8
13	300	10.4	210	5.0	110	3.6		2.9
14	300	10.5	210	4.8	110	3.5	3.9	2.9
15	290	10.5	220	4.6	110	3.4	3.6	2.9
16	280	10.2	230	4.4	110	3.0	3.7	3.0
17	260	10.4	240	---	110	2.5	3.4	3.1
18	240	9.7	---	---	100	---	2.5	3.2
19	230	8.7						3.2
20	220	7.0						3.2
21	240	5.4						3.1
22	260	4.7						2.9
23	270	4.4						2.9

Time: 30.0°E.
Sweep: 1.0 Mc to 15.0 Mc in 7 seconds.

Table 17

Capetown, Union of S. Africa (34.2°S, 18.3°E) October 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	290	3.8						2.8
01	290	3.8						2.8
02	270	3.6						2.8
03	270	3.6						2.9
04	270	3.6						2.8
05	270	3.3						2.8
06	270	4.2			---	1.5		3.0
07	240	6.1	240	---	120	2.1		3.3
08	260	7.1	240	---	120	2.7		3.2
09	280	7.8	220	4.5	110	3.1		3.1
10	300	8.3	210	4.7	110	3.3		2.9
11	300	9.0	210	4.9	110	3.5		2.8
12	310	9.9	210	5.0	110	3.6		2.8
13	310	10.4	210	5.0	110	3.6		2.8
14	300	10.5	210	4.9	110	3.5	3.5	2.9
15	300	10.5	220	4.7	110	3.4		2.9
16	280	10.2	220	4.4	110	3.1		2.9
17	270	10.0	230	4.0	110	2.8	3.4	3.1
18	250	9.5	240	3.4	120	2.2	3.0	3.1
19	230	8.9			---	---	1.6	3.2
20	220	7.3						3.2
21	230	5.7						3.2
22	250	4.4						3.0
23	270	4.0						2.9

Time: 30.0°E.
Sweep: 1.0 Mc to 15.0 Mc in 7 seconds.

Table 18

Resolute Bay, Canada (74.7°N, 94.9°W) September 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	270	3.8						2.8
01	270	4.0						2.8
02	260	3.9						2.9
03	270	3.8						3.0
04	270	3.5						3.0
05	280	3.8	---	---				3.0
06	270	4.0	---	---				3.0
07	260	4.0	---	---				3.0
08	310	4.1	240	3.2	---	---		3.0
09	300	4.7	220	3.5	---	---		3.0
10	350	4.7	220	3.6	---	---		2.9
11	360	4.7	230	3.7	---	---		2.8
12	360	4.8	230	3.8	---	---		2.8
13	410	4.3	220	3.6	---	---		3.0
14	370	4.8	240	3.6	---	---		2.9
15	370	4.8	230	3.6	---	---		2.8
16	320	4.5	240	3.5	---	---		2.8
17	280	4.3	250	3.0	---	---		3.0
18	280	4.4	---	---				3.0
19	270	4.4						3.0
20	250	4.2						2.9
21	270	4.1						2.8
22	260	4.2						2.8
23	260	3.8						2.8

Time: 90.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 19

Fort Chimo, Canada (58.1°N, 68.3°W) September 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	(300)	(3.2)					5.3	---
01	300	(2.8)			---	---	4.8	---
02	(300)	(2.6)			---	---	4.2	---
03	(340)	2.8			100	2.8	4.0	---
04	(320)	(3.0)			100	2.7	4.1	---
05	(290)	4.0	---	---	110	2.8	4.4	---
06	270	<4.3	---	---	120	2.8	3.9	(3.0)
07	340	4.6	230	3.7	100	3.3	3.2	3.0
08	300	5.0	210	3.8	100	3.0	2.6	2.8
09	300	5.2	200	4.2	100	3.0		3.0
10	330	5.3	210	4.2	100	3.2		2.8
11	380	5.6	200	4.2	100	3.2	3.0	2.8
12	380	5.5	200	4.2	100	3.2	1.6	2.9
13	320	5.9	200	4.2	100	3.1		3.0
14	400	5.2	210	4.0	100	3.0		2.8
15	350	5.0	220	4.0	100	3.0		2.7
16	310	5.0	220	4.0	100	2.8	3.0	2.8
17	300	4.9	---	---	100	3.0	4.8	---
18	280	4.7			100	3.0	6.0	---
19	280	4.8			---	---	6.8	---
20	270	4.1			---	---	6.9	---
21	(260)	(4.2)			---	---	6.2	---
22	270	3.8			---	---	5.5	---
23	260	3.3					5.0	---

Time: 75.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 20

Lindau/Harz, Germany (51.6°N, 10.1°E) September 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	3.7					2.3	2.7
01	300	3.2					2.4	2.6
02	300	3.0					2.5	2.7
03	300	2.9					2.8	2.7
04	290	3.0					2.8	2.7
05	290	2.6					2.6	2.8
06	260	3.4	---	---	---	E	2.8	3.0
07	270	4.3	250	3.5	110	2.2	3.2	3.0
08	315	5.1	230	3.8	100	2.6	3.0	3.0
09	330	5.3	220	4.2	100	2.8	3.6	2.9
10	340	5.4	220	4.3	100	3.0	3.0	2.9
11	350	5.8	220	4.4	100	3.1	3.8	2.9
12	320	6.1	210	4.4	100	3.2	2.8	2.9
13	310	6.2	210	4.5	100	3.2	3.4	3.0
14	290	6.4	220	4.5	100	3.2	2.9	3.0
15	280	6.3	230	4.4	100	3.0	2.8	3.1
16	280	6.2	230	4.2	100	2.7	2.8	3.0
17	275	6.3	240	---	100	2.4	2.8	3.0
18	260	6.4	240	---	140	1.8	2.8	2.9
19	255	6.3					2.9	2.9
20	250	5.8					2.2	3.0
21	250	4.9					2.0	2.9
22	270	4.2					2.2	2.8
23	290	3.8					2.2	2.7

Time: 15.0°E.
Sweep: 1.0 Mc to 16.0 Mc in 8 minutes.

Table 21

Graz, Austria (47.1°N, 15.5°E) September 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00								
01								
02								
03								
04	300	3.4						
05	295	3.1						
06	250	4.0					3.6	
07	230	5.0	200	4.0			4.0	
08	250	5.8	210	4.0	110	3.0	4.2	
09	260	6.0	200	4.7	110	3.1	4.2	
10	290	6.9	200	4.7	110	3.2	4.0	
11	290	7.0	200	4.9	105	3.6	3.9	
12	300	7.0	200	4.9	100	3.7	4.0	
13	290	7.3	200	4.9	100	3.5	3.8	
14	290	7.2	200	4.9	100	3.4	3.9	
15	250	6.8	200	4.8	110	3.2	4.5	
16	240	6.9	210		110	3.0	3.9	
17	240	6.9				2.6	3.8	
18	240	7.0					4.2	
19	240	7.2					4.0	
20	250	6.3					4.7	
21	250	5.1					5.0	
22								
23								

Time: 15.0°E.
Sweep: 2.5 Mc to 12.0 Mc in 2 minutes.

Table 22

Ottawa, Canada (45.4°N, 75.7°W) September 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	2.8					1.8	2.8
01	310	2.7					1.8	2.8
02	320	2.6					1.8	2.7
03	310	2.6					1.8	2.7
04	(300)	2.6					1.8	(2.8)
05	280	2.7					1.8	2.9
06	260	3.8	---	---	---	2.0	1.9	3.2
07	270	4.8	220	---	110	2.6		3.2
08	310	5.0	220	4.0	110	2.8		3.2
09	320	5.4	210	4.2	110	3.0	2.8	3.1
10	350	5.6	210	4.4	110	3.4	3.5	3.1
11	340	6.0	200	4.5	110	3.4		3.0
12	340	6.0	210	4.6	110	3.4		3.0
13	360	6.0	210	4.5	120	3.4	3.4	3.0
14	340	6.2	220	4.4	110	3.3		3.0
15	320	6.6	220	4.2	120	3.0		3.0
16	300	6.5	230	3.9	120	2.8		3.0
17	280	6.7	240	3.7	120	2.5		3.0
18	250	6.5	---	---	---	---	2.0	3.0
19	240	6.2					1.8	3.0
20	250	5.0					1.8	3.0
21	280	4.6					1.8	2.9
22	300	3.6					1.7	2.9
23	300	3.3					1.8	2.9

Time: 75.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 23

Wakkanai, Japan (45.4°N, 141.7°E) September 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	350	4.6						2.6
01	340	4.3						2.5
02	330	4.4						2.6
03	330	4.2					2.1	2.6
04	320	4.1					2.2	2.6
05	320	4.4			---	E	2.1	2.8
06	300	5.4	300	3.5	120	2.0	2.4	3.0
07	290	6.0	280	4.0	120	2.5	3.2	3.0
08	300	6.4	270	4.3	120	2.8	3.2	2.9
09	310	6.9	260	4.6	110	3.0		3.0
10	310	7.2	250	4.6	120	3.2		2.9
11	320	7.2	250	4.8	110	---		2.9
12	330	7.2	260	4.7	110	---		2.9
13	330	7.0	270	4.7	120	---		2.9
14	330	7.0	270	4.6	100	3.0		2.9
15	300	7.0	280	4.4	110	2.8		2.9
16	300	7.0	280	3.8	120	2.7	3.3	3.0
17	290	7.1			120	2.1	3.0	3.0
18	280	6.5			---	---	3.2	2.9
19	300	6.5					3.0	2.8
20	300	6.6					3.0	2.8
21	300	6.0					2.0	2.7
22	310	5.2						2.7
23	330	5.1					1.8	2.6

Time: 135.0°E.
Sweep: 1.0 Mc to 17.0 Mc in 2 minutes.

Table 24

Akita, Japan (39.7°N, 140.1°E) September 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	4.7					2.6	2.8
01	300	4.6					2.6	2.8
02	290	4.3					2.5	2.8
03	270	4.4					2.4	2.8
04	280	4.2					2.4	2.8
05	280	4.4					2.4	3.0
06	240	5.7	---	---	120	2.0	3.1	3.2
07	250	7.1	230	---	110	2.5	3.8	3.3
08	260	7.2	220	4.4	110	2.8	4.0	3.3
09	270	7.6	230	4.6	110	3.1	4.2	3.2
10	290	7.4	230	4.8	110	3.3	4.2	3.2
11	290	7.8	230	4.8	110	3.4	3.8	3.2
12	300	8.0	220	4.8	110	3.4	3.7	3.1
13	290	8.1	230	4.8	110	3.3	3.5	3.1
14	290	7.9	230	4.6	110	3.2	3.5	3.2
15	280	7.6	240	4.4	110	3.0	3.6	3.2
16	260	7.4	240	4.1	110	2.6	3.6	3.2
17	250	7.8	260	---	110	2.3	3.6	3.2
18	240	7.7					3.6	3.2
19	240	6.9					3.4	3.1
20	260	6.1					3.0	3.0
21	290	5.5					3.4	2.8
22	280	5.0					3.0	2.8
23	280	5.0					3.0	2.8

Time: 135.0°E.
Sweep: 1.0 Mc to 17.0 Mc in 15 minutes, manual operation.

Table 25

Tokyo, Japan (35.7°N, 139.5°E) September 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	290	5.2					2.4	2.8
01	300	4.9					2.6	2.8
02	300	4.4					2.8	2.7
03	280	4.1					2.6	2.8
04	280	4.1					2.8	2.8
05	290	4.2					2.5	2.8
06	250	6.3	---	---	120	1.8	3.3	3.2
07	250	7.7	250	---	110	2.5	3.9	3.2
08	260	8.0	240	---	110	2.8	4.6	3.3
09	280	7.8	220	4.7	100	3.1	4.4	3.2
10	280	8.0	210	4.8	100	3.2	3.6	3.1
11	300	8.8	220	4.9	100	---	3.6	3.0
12	300	8.8	220	5.1	100	3.5	3.8	3.1
13	300	8.8	220	5.0	110	3.5		3.1
14	300	8.4	230	4.7	100	3.2		3.1
15	290	8.2	240	4.6	100	2.9		3.1
16	280	8.2	240	---	100	2.7	2.4	3.1
17	260	8.2	250	---	110	2.3	3.7	3.2
18	250	8.2			110	1.4	3.6	3.2
19	240	6.8					3.7	3.1
20	250	6.0					2.9	2.9
21	290	5.4					3.4	2.8
22	300	5.1					2.8	2.7
23	290	5.2					2.7	2.8

Time: 135.0°E.
Sweep: 1.0 Mc to 17.2 Mc in 2 minutes.

Table 26

Yamagawa, Japan (31.2°N, 130.6°E) September 1951

Time	h'F2	foF2	h'F1	foF1	h'E	fcE	fEs	(M3000)F2
00	300	5.1					2.4	2.8
01	290	5.2					2.1	2.8
02	300	4.7					2.1	2.8
03	270	4.4					2.1	2.8
04	270	4.4					2.1	2.9
05	290	4.0					2.0	2.8
06	280	4.2	---	---	---	1.5	2.2	2.9
07	250	(7.0)	---	---	120	2.1	2.9	(3.3)
08	240	8.1	230	---	110	2.6	3.8	3.3
09	250	7.9	230	---	110	2.9	4.2	3.2
10	280	8.7	220	5.0	110	3.2	4.4	3.0
11	290	10.5	220	5.0	100	3.4	4.4	3.0
12	300	10.9	210	---	100	3.4	4.0	3.0
13	300	11.5	220	5.0	100	3.4	4.0	(3.0)
14	300	11.2	220	---	100	3.3		3.0
15	290	10.2	240	---	100	3.1	3.7	3.0
16	280	9.4	250	4.5	110	2.8		(3.1)
17	250	10.6	250	---	110	2.4	4.0	3.1
18	250	8.1	---	---	120	1.9	3.4	(3.2)
19	240	(7.3)					3.5	(3.0)
20	230	6.2					3.5	3.2
21	260	5.2					3.4	2.8
22	290	5.2					4.0	2.8
23	300	5.0					2.6	2.7

Time: 135.0°E.
Sweep: 1.0 Mc to 22.0 Mc in 2 minutes.

Table 27

Formosa, China (25.0°N, 121.5°E) September 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	240	7.7					3.1	3.5
01	230	7.4					2.8	3.7
02	215	6.9					3.0	3.9
03	210	5.6	---	---				4.0
04	210	4.3	---	---	---	---	2.7	3.7
05	220	3.8	---	---	---	---	2.7	3.9
06	200	6.0	---	---	110	3.1	2.8	4.0
07	180	7.9	210	---	100	3.1	3.9	4.3
08	190	8.6	180	4.5	100	3.1	4.8	4.0
09	215	9.0	180	4.8	90	3.4	4.8	4.0
10	240	10.3	170	5.0	100	3.5	5.4	3.6
11	260	11.3	180	5.4	100	3.8	4.8	3.5
12	250	12.0	170	5.4	100	3.8	4.6	3.6
13	240	12.4	170	5.2	100	3.9	4.4	3.8
14	240	12.7	170	5.2	100	3.6	4.2	3.8
15	240	12.5	200	5.2	100	3.4	4.2	3.7
16	240	13.2	185	4.5	100	3.2	4.2	3.8
17	220	12.5	195	4.5	100	---	3.8	4.0
18	180	11.8	---	---	100	---	4.1	4.0
19	180	10.8	---	---	90	3.2	3.4	4.0
20	200	9.8			---	---	3.5	3.8
21	220	9.0					3.1	3.8
22	220	8.8					3.5	3.5
23	240	8.2					3.1	3.5

Time: 120.0°E.
Sweep: 2.3 Mc to 14.5 Mc in 15 minutes.

Table 28

Brisbane, Australia (27.5°S, 153.0°E) September 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	260	4.9						3.0
01	250	4.7						3.0
02	250	4.3						3.0
03	270	4.0						2.9
04	275	3.6						2.8
05	280	3.5						2.9
06	250	4.6			150	2.0		3.2
07	250	6.6	235	4.3	110	2.6		3.3
08	265	7.6	230	4.4	100	3.0		3.2
09	270	8.0	210	4.7	100	3.3		3.2
10	280	8.2	210	4.8	100	3.4		3.2
11	280	8.1	210	4.8	100	3.6		3.2
12	280	8.0	210	4.8	100	3.6		3.2
13	290	8.1	210	4.8	100	3.5		3.1
14	270	7.6	210	4.7	100	3.4		3.2
15	260	7.5	210	4.4	100	3.2		3.2
16	250	7.0	220	4.0	110	2.8		3.2
17	230	6.9			120	2.2		3.2
18	230	6.4						3.0
19	250	6.1						2.8
20	255	6.0						2.8
21	270	5.9						2.8
22	265	5.5						2.9
23	260	5.2						3.0

Time: 150.0°E.
Sweep: 1.0 Mc to 16.0 Mc in 1 minute 55 seconds.

Table 29

Watheroo, W. Australia (30.3°S, 115.9°E) September 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	270	3.7					3.0	2.9
01	270	3.6					3.0	2.8
02	260	3.5					2.9	2.9
03	260	3.3					3.0	2.9
04	270	3.0					3.0	2.8
05	280	2.9					3.2	2.8
06	270	3.7				1.8	2.8	3.0
07	250	5.6	250	3.4		2.3	2.8	3.3
08	265	6.6	230	4.0		2.8	3.0	3.3
09	270	7.0	215	4.4		3.2	3.2	3.2
10	295	7.3	210	4.7		3.3		3.2
11	300	7.7	210	4.8		3.3		3.1
12	305	8.1	210	4.8		3.4	3.7	3.2
13	290	8.1	210	4.8		3.3		3.1
14	280	7.8	210	4.6		3.3		3.2
15	270	7.8	220	4.3		3.2		3.2
16	260	7.2	230	4.0		2.9	3.0	3.2
17	250	6.7	230	3.0		2.4	3.0	3.2
18	240	6.7					2.8	3.2
19	230	5.5					2.7	3.0
20	250	5.1					2.4	3.0
21	260	4.8					2.6	2.9
22	265	4.3					2.6	2.9
23	260	3.8					2.6	2.9

Time: 120.0°E.
Sweep: 16.0 Mc to 0.5 Mc in 15 minutes, automatic operation.

Table 30

Hobart, Tasmania (42.8°S, 147.4°E) September 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	3.0						2.8
01	300	3.0						2.8
02	300	2.6						2.8
03	300	2.6						2.9
04	290	2.5						2.9
05	300	2.1						2.9
06	280	3.0			---	E		2.9
07	250	4.3	---	---	110	2.1		3.1
08	250	4.6	250	4.0	100	2.7		3.0
09	320	5.2	230	4.4	100	3.0		3.0
10	370	5.6	220	4.5	100	3.3		2.8
11	330	6.5	215	4.5	100	3.5		2.8
12	330	6.5	210	4.5	100	3.5		2.9
13	310	6.6	210	4.5	100	3.5		3.0
14	300	6.8	210	4.5	100	3.4		3.0
15	300	7.0	220	4.4	100	3.1		3.0
16	250	6.4	220	4.0	100	2.7		3.0
17	240	6.4			100	2.2		3.0
18	245	6.2			130	1.5		3.0
19	250	5.6						2.9
20	250	5.0						2.8
21	255	4.5						2.8
22	270	4.0						2.8
23	280	3.6						2.8

Time: 150.0°E.
Sweep: 1.0 Mc to 13.0 Mc in 1 minute 55 seconds.

Table 31

Christchurch, New Zealand (43.6°S, 172.7°E) September 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	3.5					2.4	2.8
01	290	3.2					2.3	2.8
02	290	2.9					2.6	2.9
03	290	2.2					3.2	2.9
04	270	1.9					3.2	2.9
05	300	1.9					3.2	3.0
06	280	3.0				1.9	2.9	3.0
07	260	4.3	---	---		2.0		3.2
08	290	4.8	250	3.8		2.5		3.2
09	340	5.5	240	4.2		2.9		3.1
10	340	5.8	230	4.5		3.1		3.0
11	330	6.2	230	4.5		3.3		3.0
12	340	6.7	230	4.6		3.4		3.0
13	330	6.5	230	4.6		3.3		3.0
14	310	6.8	240	4.4		3.1		3.1
15	300	6.4	230	4.2		2.9		3.1
16	280	6.5	240	3.8		2.6		3.1
17	260	6.2	260	3.1		1.9		3.1
18	250	6.0				1.4		3.0
19	260	5.6						2.8
20	280	5.4						2.8
21	280	4.8						2.8
22	280	4.4						2.8
23	290	3.8						2.8

Time: 172.5°E.
Sweep: 1.0 Mc to 13.0 Mc in 1 minute 55 seconds.

Table 32

Resolute Bay, Canada (74.7°N, 94.9°W) August 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	260	4.7	---	---				3.0
01	260	4.5	---	---				3.0
02	260	4.3	---	---				3.0
03	260	4.1	---	---				3.0
04	250	4.1	250	---				3.0
05	260	4.2	230	(3.3)				3.0
06	320	4.4	220	3.4	---	---		3.0
07	320	4.6	220	3.5	---	---		3.0
08	360	4.6	220	3.8	---	---		2.9
09	380	4.7	210	3.8	---	---		2.8
10	420	5.0	200	3.8	---	---		2.8
11	370	4.8	210	3.9	---	---		2.9
12	380	5.2	200	3.9	---	---		2.8
13	380	5.0	200	4.0	---	---		2.8
14	370	5.0	210	3.9	---	---		2.9
15	380	5.2	210	3.9	---	---		2.8
16	380	5.0	210	3.8	---	---		2.9
17	370	4.8	220	3.8	---	---		2.8
18	350	4.8	220	3.6	---	---		2.8
19	300	4.8	240	3.5				2.9
20	280	4.8	260	3.5				3.0
21	260	4.7	---	---				3.0
22	250	4.6	---	---				3.0
23	260	4.6	---	---				3.0

Time: 90.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 33

Reykjavik, Iceland (64.1°N, 21.8°W) August 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	(390)	(3.6)					4.3	(2.6)
01	---	(3.7)					4.4	(2.5)
02	(390)	(3.7)					4.6	(2.6)
03	(350)	(3.5)					4.7	(2.6)
04	(330)	3.4			---	---	4.4	(2.7)
05	(340)	4.1	---	---	---	---	4.2	2.8
06	(360)	4.2	280	---	120	---		2.8
07	360	4.7	260	3.6	120	---		2.9
08	400	4.6	260	3.9	120	2.7		2.8
09	410	4.9	250	4.0	120	(2.8)		2.7
10	430	5.4	240	4.3	120	---		2.6
11	420	5.4	250	4.3	120	(3.1)		2.7
12	400	5.4	240	4.4	120	(3.0)		2.8
13	440	5.4	240	4.3	120	3.1		2.6
14	420	5.4	250	4.3	120	3.0		2.7
15	450	5.2	250	4.2	120	3.0		2.6
16	420	5.0	260	4.1	120	2.8		2.7
17	410	5.0	280	4.0	120	---	3.1	2.7
18	360	4.8	290	---	120	---	4.4	2.8
19	360	4.7	---	---	---	---	4.0	2.7
20	340	5.0	---	---	---	---	4.2	2.8
21	350	(4.4)					4.6	(2.7)
22	390	(3.7)					4.4	(2.6)
23	(380)	(3.6)					4.6	(2.6)

Time: 15.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 18 seconds.

Table 34*

Fraserburgh, Scotland (57.6°N, 2.1°W) August 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	305	4.0					2.3	2.6
01	290	3.9					2.7	2.6
02	310	3.6					2.8	2.6
03	315	3.1					2.8	2.7
04	300	3.2			150	1.4	3.0	2.8
05	270	3.5	250#	(3.1)#	135	1.7	2.8	2.9
06	290	4.2	245	3.5	120	2.2	3.0	3.0
07	380	4.6	240	3.9	115	2.5	3.0	3.0
08	380	5.1	225	4.1	110	2.8	3.0	3.0
09	390	5.4	220	4.3	110	3.0	3.1	2.9
10	395	5.5	220	4.4	110	3.1	3.1	3.0
11	420	5.6	220	4.5	105	3.2	3.1	2.9
12	400	5.5	215	4.6	105	3.2	3.0	2.9
13	390	5.6	220	4.6	110	3.2	3.1	3.0
14	390	5.6	220	4.5	110	3.2	3.1	2.8
15	385	5.6	230	4.4	110	3.1	3.0	2.8
16	355	5.8	230	4.3	110	2.9	3.0	2.9
17	335	5.8	235	4.0	115	2.7	3.0	2.9
18	300	5.9	240	3.7	125	2.3	2.8	3.0
19	265	6.0	250	3.4	140	1.9	2.6	2.9
20	265	6.3	285#	(2.7)#	140#	1.7	2.0	3.0
21	265	5.8						2.8
22	275	5.0						2.7
23	295	4.4						2.6

Time: 0.0°.
Sweep: 0.67 Mc to 15.0 Mc in 4 minutes.
*Average values except foF2 and fEs, which are median values.
#One or two observations only.

Table 35

Lindau/Harz, Germany (51.6°N, 10.1°E) August 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	280	4.5					2.3	2.7
01	280	4.0					2.8	2.7
02	280	4.0					2.6	2.7
03	280	3.5					2.7	2.7
04	280	3.4					2.8	2.8
05	270	3.7	---	---	---	E	3.3	2.9
06	250	4.4	240	---	100	2.1	3.3	3.1
07	300	4.8	230	3.9	100	2.5	4.0	3.0
08	330	5.4	220	4.2	100	2.9	4.4	3.0
09	320	5.8	200	4.4	100	3.0	4.7	3.0
10	330	6.0	200	4.5	100	3.2	4.4	3.0
11	340	6.0	200	4.6	100	3.3	4.5	3.0
12	330	6.1	200	4.7	100	3.3	4.7	3.0
13	340	6.0	200	4.7	100	3.4	4.4	3.0
14	350	5.9	200	4.7	100	3.3	4.3	3.0
15	340	6.0	210	4.5	100	3.2	4.0	2.9
16	310	5.8	220	4.3	100	3.0	3.9	3.0
17	300	6.1	210	4.1	100	2.8	4.5	3.0
18	280	6.2	220	---	100	2.4	4.2	3.0
19	260	6.4	---	---	100	1.8	4.4	3.0
20	250	6.8					3.5	3.0
21	260	6.8					3.7	2.9
22	250	5.9					2.8	2.9
23	260	5.0					2.5	2.8

Time: 15.0°E.
Sweep: 1.0 Mc to 16.0 Mc in 8 minutes.

Table 36*

Slough, England (51.5°N, 0.6°W) August 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	295	4.4					2.4	2.6
01	285	4.1					2.6	2.6
02	295	3.8					2.6	2.6
03	295	3.5					2.9	2.6
04	285	3.2					3.4	2.7
05	295	3.7	285	3.0	120	1.6	3.8	2.8
06	295	4.6	245	3.6	120	2.1	4.5	3.0
07	350	5.0	240	4.0	115	2.5	4.5	3.0
08	375	5.4	230	4.3	115	2.9	4.9	3.0
09	355	5.6	220	4.5	110	3.1	4.9	3.0
10	375	6.0	225	4.6	110	3.2	4.8	3.0
11	365	6.0	225	4.7	110	3.3	4.8	3.0
12	360	6.1	215	4.8	115	3.4	4.9	3.0
13	360	6.1	225	4.8	115	3.4	4.9	2.9
14	365	6.1	225	4.8	115	3.4	4.7	2.9
15	350	6.1	230	4.7	115	3.2	4.6	2.9
16	330	6.2	225	4.5	115	3.1	4.4	2.9
17	310	6.2	235	4.2	120	2.7	4.2	3.0
18	290	6.6	245	3.7	120	2.2	4.0	2.9
19	270	6.9	260	3.4	125	1.9	3.6	2.9
20	260	7.1					3.8	2.9
21	255	6.5					2.8	2.8
22	265	5.6					2.0	2.8
23	280	5.0					2.4	2.7

Time: 0.0°.
Sweep: 0.55 Mc to 16.5 Mc in 5 minutes, automatic operation.
* Average values except foF2 and fEs, which are median values.

Table 37

Graz, Austria (47.1°N, 15.5°E) August 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00								
01								
02								
03								
04	300	3.9					3.7	
05	280	4.0					3.6	
06	240	5.0		3.7			4.1	
07	260	5.2	210	4.1	100	2.8	4.0	
08	(300)	6.3	200	4.4	100	3.0	4.8	
09	290	6.0	200	4.7	100	3.2	5.0	
10	300	7.0	200	4.8	100	3.4	5.0	
11	300	6.6	200	4.9	100	3.5	5.2	
12	320	6.9	200	5.0	100	3.7	5.0	
13	310	6.8	200	4.9	100	3.7	5.0	
14	300	6.8	200	4.9	100	3.6	5.0	
15	300	6.6	200	4.8	100	3.3	4.8	
16	300	6.6	200	4.4	100	3.1	4.5	
17	280	6.4	220	4.2	100	2.9	4.2	
18	250	6.7		(3.8)			4.8	
19	250	7.4					4.8	
20	240	(7.5)					4.6	
21	250	7.2					4.9	
22								
23								

Time: 15.0°E.
Sweep: 2.5 Mc to 12.0 Mc in 2 minutes.

Table 38*

Singapore, British Malaya (1.3°N, 103.8°E) August 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	235	7.6					3.2	3.0
01	245	6.1					2.8	2.9
02	250	4.6						3.0
03	245	4.6						3.0
04	250	3.9						3.1
05	250	3.0						3.1
06	290	4.1					2.5	2.9
07	245	7.5			125	(2.5)	3.6	2.9
08	240	9.7	240#		130	3.0	4.0	2.7
09	290	10.5	215		125	(3.4)	4.2	2.5
10	325	10.5	205	(4.9)#	140#	(3.4)#	4.2	2.5
11	340	10.6	205	5.0		(3.6)#	4.2	2.4
12	355	10.6	205	(5.0)	130	(3.7)	4.2	2.3
13	360	10.5	205	(5.0)			4.2	2.2
14	335	(10.4)	205	(4.8)		(3.4)#	4.2	2.3
15	325	10.6	205	4.7#	130#	3.4 #	4.1	2.3
16	225	10.4	210		125	3.0	3.9	2.3
17	235	10.8			125	2.6	3.2	2.5
18	255	(11.0)					2.8	2.5
19	275	(11.1)						2.8#
20	255	(10.9)						2.8
21	225	10.7					2.8	3.2
22	215	9.4					2.4	3.3
23	230	8.6					2.8	3.1

Time: 105.0°E.
Sweep: 2.2 Mc to 16.0 Mc in 1 minute.
*Average values except for foF2 and fEs, which are median values.
#One or two observations only.

Table 39

Brisbane, Australia (27.5°S, 153.0°E) August 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	260	4.3						3.0
01	260	4.2						3.1
02	250	4.1					1.8	3.1
03	250	4.0						3.1
04	250	3.5						3.0
05	260	3.3						2.9
06	250	3.7						3.1
07	230	6.0			120	2.3		3.4
08	240	7.0	230	4.1	105	2.6		3.4
09	260	7.3	220	4.5	100	3.1		3.4
10	260	7.6	215	4.7	100	3.3		3.4
11	270	7.6	205	4.7	100	3.4		3.3
12	270	7.4	200	4.7	100	3.4		3.3
13	270	7.5	210	4.7	100	3.4		3.3
14	270	7.6	200	4.5	100	3.4		3.2
15	250	7.4	200	4.4	100	3.0		3.3
16	230	6.7	220	3.7	100	2.7		3.3
17	230	6.6			130	2.1	2.0	3.3
18	220	6.0					1.8	3.1
19	225	5.1						3.1
20	250	4.8						3.0
21	250	4.5						3.0
22	270	4.2						3.0
23	260	4.3						3.0

Time: 150.0°E.
Sweep: 1.0 Mc to 16.0 Mc in 1 minute 55 seconds.

Table 40

Buenos Aires, Argentina (34.5°S, 58.5°W) August 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	3.6						2.9
01	300	3.6						2.9
02	290	3.7						3.0
03	250	3.6						3.1
04	230	3.3						3.3
05	300	2.4						3.0
06	280	2.8						3.1
07	230	5.1						3.5
08	240	(6.4)	240	---	---	---		(3.5)
09	260	(7.0)	230	---	---	---		(3.5)
10	270	(8.0)	220	---				(3.4)
11	270	8.6	220	---				3.4
12	270	8.8	220	---				3.4
13	270	9.2	230	---				3.4
14	260	8.8	220	---				3.4
15	250	9.1	230	---				3.4
16	230	7.8	210	---				3.5
17	230	7.0						3.4
18	210	6.4						3.4
19	230	5.6						3.3
20	240	5.3						3.2
21	250	5.0						3.2
22	270	4.2						3.1
23	300	3.8						3.0

Time: 60.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 30 seconds.

Table 41

Hobart, Tasmania (42.8°S, 147.4°E) August 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	2.7					3.1	2.9
01	300	2.5					3.2	2.9
02	295	2.5					3.0	2.8
03	300	2.4					3.0	2.8
04	280	2.2					3.2	2.9
05	260	2.2					2.7	2.9
06	270	2.0					3.1	2.9
07	250	3.5			---	E	2.5	3.0
08	250	5.0			110	2.4		3.2
09	240	5.6	---	---	100	2.8		3.2
10	255	6.0	215	4.3	100	3.0		3.1
11	280	6.5	210	4.4	100	3.2		3.0
12	300	6.5	210	4.5	100	3.3		3.0
13	280	7.2	215	4.5	100	3.3		3.1
14	280	7.0	220	4.4	100	3.1		3.1
15	260	7.1	210	4.2	100	3.0		3.1
16	245	7.0	220	3.7	100	2.5		3.1
17	240	6.5			110	1.7	2.6	3.1
18	230	5.7			---	E		3.0
19	250	5.4						2.9
20	250	4.6						2.9
21	250	4.0						2.9
22	250	3.2						2.8
23	290	3.0					3.2	2.8

Time: 150.0°E.
Sweep: 1.0 Mc to 13.0 Mc in 1 minute 55 seconds.

Table 42

Christchurch, New Zealand (43.6°S, 172.7°E) August 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	2.9					3.2	2.8
01	300	2.8					3.4	2.9
02	290	2.7					3.5	2.9
03	280	2.3					3.7	3.0
04	260	2.0					3.6	3.1
05	250	1.8					3.2	3.2
06	270	1.8				---	3.7	3.0
07	260	3.6				1.3	3.4	3.2
08	250	4.9	250	3.2		2.0	3.2	3.4
09	260	5.7	240	3.7		2.6	4.0	3.4
10	280	6.0	230	4.2		2.9	3.7	3.2
11	280	6.5	230	4.3		3.0	3.5	3.2
12	300	6.6	220	4.3		3.1	4.0	3.2
13	280	6.9	230	4.3		3.0	4.4	3.2
14	290	6.7	240	4.3		2.9	4.4	3.2
15	270	6.5	230	3.9		2.7	4.0	3.2
16	260	6.4	240	3.3		2.3	4.0	3.3
17	250	5.9	---	---		---	3.0	3.3
18	250	5.2				---	2.0	3.0
19	250	5.0					1.4	2.9
20	260	4.2						2.9
21	260	3.8						2.8
22	280	3.4					2.8	2.9
23	280	3.2					3.2	2.9

Time: 172.5°E.
Sweep: 1.0 Mc to 13.0 Mc in 1 minute 55 seconds.

Table 43

Resolute Bay, Canada (74.7°N, 94.9°W) July 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	280	4.8	250	---				3.0
01	270	4.8	220	---				3.0
02	270	4.7	210	---				3.0
03	300	4.8	210	3.4				3.1
04	300	4.7	200	3.5				3.0
05	350	4.8	220	3.7	110	2.7		2.9
06	340	4.7	210	3.8	100	---		3.0
07	380	4.8	200	4.0	100	2.9		3.0
08	390	4.8	200	4.0	---	---		2.8
09	380	5.0	200	4.0	---	---		3.0
10	460	4.8	200	4.0	100	---		2.8
11	410	5.1	200	4.1	---	---		2.8
12	380	5.4	200	4.0	100	---		2.9
13	400	5.1	200	4.0	---	---		2.7
14	400	5.4	200	4.0	---	---		2.9
15	400	5.1	200	4.0	---	---		3.0
16	380	5.2	210	4.0	---	---		3.0
17	370	5.4	200	4.0	---	---		3.0
18	370	5.0	220	3.9	---	---		2.9
19	350	5.0	220	3.7	---	---		2.9
20	300	4.9	220	3.7	---	---		3.0
21	280	5.0	220	3.6	---	---		3.0
22	290	5.0	230	3.4	---	---		3.0
23	280	5.0	240	3.4				3.0

Time: 90.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 15 seconds.

Table 44

Reykjavik, Iceland (64.1°N, 21.8°W) July 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	---	(4.0)					4.7	(2.6)
01	---	(4.2)					4.6	([illegible])
02	(380)	(4.4)					4.4	(2.6)
03	(370)	(4.1)					4.8	([illegible])
04	---	(4.3)	---	---	---	---	4.4	([illegible])
05	(490)	4.4	280	---	---	---	[illegible]	[illegible]
06	(480)	4.5	260	3.7	120	2.6	2.8	[illegible]
07	400	4.6	250	3.9	120	2.8		[illegible]
08	440	4.7	240	4.1	120	2.9		[illegible]
09	440	5.0	240	4.3	120	3.0		2.7
10	450	5.4	230	4.4	120	3.1		[illegible]
11	440	5.2	230	4.4	120	3.2		[illegible]
12	420	5.4	220	4.4	120	3.3		2.7
13	410	5.4	230	4.4	120	3.3		2.7
14	410	5.4	230	4.4	120	3.3		2.7
15	400	5.4	230	4.3	110	3.2		2.7
16	410	5.5	240	4.3	120	(3.0)		2.7
17	400	5.4	250	4.2	120	2.8		2.7
18	380	5.0	260	4.0	120	2.8	4.3	2.7
19	370	5.2	260	3.9	110	---	4.3	[illegible]
20	340	(5.0)	---	---	---	---	4.4	2.9
21	360	(4.7)	---	---	---	---	4.6	(2.7)
22	340	(4.2)					5.6	(2.8)
23	(350)	(4.3)					4.5	---

Time: 15.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 18 seconds.

Table 45*

Fraserburgh, Scotland (57.6°N, 2.1°W) July 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	285	4.6					2.2	2.7
01	275	(4.2)					2.7	2.6
02	290	3.9			210#	0.9	2.7	2.6
03	305	3.8			135	(1.2)	2.8	2.6
04	310	4.0	275	(2.8)	125	1.7	3.0	2.7
05	320	4.2	240	3.2	125	2.1	3.0	2.7
06	370	4.5	240	3.8	115	2.5	3.0	2.8
07	350	4.9	230	3.9	110	2.8	3.1	2.8
08	365	5.3	225	4.3	105	3.0	3.1	2.8
09	360	5.9	220	4.5	105	3.1	3.5	2.9
10	390	5.8	220	4.6	105	3.2	3.4	2.8
11	400	5.8	225	4.6	100	3.3	3.7	2.8
12	390	5.9	225	4.7	105	3.4	3.6	2.8
13	370	5.9	215	4.7	105	3.4	3.1	2.9
14	385	5.8	220	4.6	105	3.3	2.8	2.9
15	380	5.7	220	4.6	110	3.2	2.9	2.9
16	355	6.0	225	4.4	110	3.1	2.8	2.8
17	340	5.9	235	4.3	110	2.9	3.2	2.9
18	320	6.2	235	3.9	115	2.7	3.0	2.9
19	295	6.1	250	3.4	125	2.3	2.9	2.9
20	260	6.1	275#	2.9#	145	1.9	2.6	2.9
21	265	6.2			165#	1.6		2.9
22	265	5.6						2.8
23	280	4.9						2.7

Time: 0.0°.
Sweep: 0.67 Mc to 15.0 Mc in 4 minutes.
*Average values except foF2 and fEs, which are median values.
#One or two observations only.

Table 46

Lindau/Harz, Germany (51.6°N, 10.1°E) July 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	260	5.6					2.3	2.7
01	260	5.0					2.1	2.7
02	260	4.6					2.5	2.7
03	270	4.2					2.9	2.7
04	280	4.2	---	---	---	E	2.9	2.8
05	300	4.4	260	2.9	100	1.7	3.8	2.8
06	330	5.0	240	3.6	100	2.3	4.2	2.9
07	320	5.6	220	4.1	100	2.7	4.3	2.9
08	330	5.6	220	4.4	100	3.0	4.9	[illegible]
09	340	6.2	220	4.4	100	3.2	4.9	2.8
10	350	6.2	210	4.6	100	3.3	5.4	2.9
11	380	6.2	210	4.7	100	3.4	5.2	2.8
12	360	6.1	210	4.7	100	3.4	5.6	2.8
13	360	6.1	200	4.7	100	3.4	5.6	2.9
14	360	6.2	210	4.8	100	3.4	5.4	2.8
15	360	6.0	210	4.6	100	3.3	4.7	2.8
16	330	6.0	210	4.5	100	3.2	4.5	[illegible]
17	310	6.0	210	4.3	100	2.9	4.4	[illegible]
18	300	6.4	230	4.0	100	2.6	3.6	[illegible]
19	280	6.5	< 250	---	100	2.2	3.5	2.9
20	260	6.8			---	E	3.4	2.9
21	260	7.1					3.4	2.9
22	260	6.8					2.7	2.8
23	260	6.2					2.8	2.8

Time: 15.0°E.
Sweep: 1.0 Mc to 16.0 Mc in 8 minutes.

Table 47*

Slough, England (51.5°N, 0.6°W) July 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	275	5.3					2.6	2.7
01	285	4.8					2.6	2.6
02	290	4.5					2.6	2.6
03	290	4.2					3.4	2.6
04	295	4.0	300#	2.2#	125	1.4	3.8	2.7
05	350	4.5	255	3.3	125	2.0	4.0	2.8
06	355	5.1	240	3.9	115	2.4	4.5	2.8
07	355	5.4	230	4.2	115	2.8	4.7	3.0
08	385	5.9	230	4.5	115	3.1	4.6	2.8
09	365	6.1	230	4.6	110	3.2	4.9	2.8
10	380	6.2	225	4.7	110	3.4	4.9	2.8
11	380	6.2	225	4.8	110	3.5	4.9	2.9
12	380	6.0	225	4.8	110	3.5	4.9	2.8
13	395	6.2	220	4.8	110	3.5	4.9	2.8
14	385	6.3	220	4.8	110	3.4	4.7	2.8
15	370	6.1	225	4.7	115	3.3	4.7	2.8
16	355	6.2	230	4.6	115	3.2	4.7	2.8
17	330	6.5	240	4.4	115	3.0	4.2	2.8
18	310	6.5	245	4.1	115	2.6	4.4	2.8
19	280	6.8	255	3.6	125	2.2	4.3	2.9
20	275	7.0	(305)#	(3.0)#	135	1.8	3.2	2.8
21	260	7.1					2.6	2.8
22	260	6.7					2.6	2.8
23	270	5.9					2.6	2.7

Time: 0.0°.
Sweep: 0.55 Mc to 16.5 Mc in 5 minutes, automatic operation.
*Average values except foF2 and fEs, which are median values.
#One or two observations only.

Table 48

Graz, Austria (47.1°N, 15.5°E) July 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00								
01								
02								
03								
04	300	4.2					4.0	
05	260	5.0					4.7	
06	310	5.7	225	3.9		2.6	4.0	
07	300	6.4	220	4.2	110	2.9	4.3	
08	300	6.6	200	4.5	100	3.1	5.0	
09	310	6.7	200	4.8	100	3.3	5.1	
10	330	6.9	200	4.9	100	3.5	5.4	
11	320	7.0	200	5.0	100	3.7	5.4	
12	330	7.0	200	4.9	100	3.7	5.4	
13	320	6.8	200	4.9	100	3.8	4.0	
14	320	6.7	200	5.0	100	3.7	5.0	
15	315	6.6	200	4.9	100	3.5	4.7	
16	310	6.3	210	4.7	100	3.1	4.6	
17	300	6.4	210	4.5	110	3.0	4.7	
18	290	6.8	230	4.0		(2.6)	4.1	
19	260	7.1					4.3	
20	250	7.4					5.0	
21	260	7.2					5.0	
22								
23								

Time: 15.0°E.
Sweep: 2.5 Mc to 12.0 Mc in 2 minutes.

Table 49*

Singapore, British Malaya (1.3°N, 103.8°E) July 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	250	6.0					3.4	3.0
01	235	5.4					3.6	3.1
02	250	4.7					2.6	3.1
03	260	4.0					3.0	3.1
04	245	3.4					2.6	3.1
05	240	2.9					3.6	3.0
06	270	4.0					2.8	2.9
07	245	7.0			120	2.5	3.7	2.9
08	245	9.7	230 #		115	3.0	4.0	2.8
09	270	10.8	210		130#	(3.1) #	4.4	2.7
10	320	11.1	205	(4.7)#	130#	(3.3) #	4.4	(2.6)
11	345	(10.5)	205	4.9	100 #	(3.7) #	4.3	2.5
12	355	10.7	205	(5.0)			4.4	2.4
13	340	10.5	205	(4.9)		(3.5) #	4.4	2.4
14	350	(10.1)	200	4.7	130 #	3.3 #	4.4	(2.4)
15	305	10.7	205	(4.6)#	115 #	(3.3) #	4.0	2.5
16	265	10.4	205		110	3.0	3.7	2.5
17	245	10.5			120	2.6	3.5	2.8
18	245	10.5					3.1	2.8
19	250	(10.1)					2.7	(2.8) #
20	235	(9.6)					3.3	3.0 #
21	220	8.6					3.4	3.2
22	225	5.8					3.2	3.3
23	245	5.5					2.8	(3.0)

Time: 105.0°E.
Sweep: 2.2 Mc to 16.0 Mc in 1 minute.
* Average values except foF2 and fEs, which are median values.
# One or two observations only.

Table 50

Rarotonga I. (21.3°S, 159.8°W) July 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	3.8						2.7
01	300	4.0						2.8
02	290	4.1						2.8
03	270	4.1						2.9
04	260	3.8						3.0
05	280	3.4						2.9
06	280	3.5						2.8
07	260	5.5			---	E	2.6	3.1
08	250	7.7	240	4.0	120	2.4	3.5	3.2
09	250	8.6	230	4.3	110	2.9	3.7	3.3
10	260	9.5	230	4.6	110	3.2		3.3
11	260	8.2	210	4.7	110	3.3	3.9	3.3
12	280	7.9	210	4.6	110	3.4		3.2
13	290	7.9	210	4.8	110	3.4	3.9	3.1
14	280	8.2	210	4.7	110	3.3	3.9	3.1
15	280	8.1	240	4.5	110	3.1	3.6	3.1
16	280	8.2	250	4.5	115	2.8	4.0	3.0
17	260	8.3	260	4.0	120	2.4	4.1	3.2
18	240	8.0			---	E	3.8	3.1
19	240	6.6					3.4	3.2
20	250	5.4					3.0	2.9
21	260	5.0					3.0	2.8
22	260	4.4					2.4	2.8
23	280	4.2						2.8

Time: 157.5°W.
Sweep: 2.0 Mc to 16.0 Mc, manual operation.

Tablo 51

Buenos Aires, Argentina (34.5°S, 58.5°W) July 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	340	3.6						2.9
01	300	3.7						2.9
02	290	3.7						3.0
03	270	3.9						3.0
04	240	3.2						3.4
05	290	2.5						3.2
06	300	2.2						3.0
07	240	4.4						3.3
08	220	6.5	---	---	---	---		3.4
09	230	7.3	220	---	---	3.0		3.5
10	250	7.5	220	---	---	---		3.5
11	250	(7.5)	220	---	---	---		3.4
12	260	8.4	220	---	---	---		3.5
13	260	8.6	220	---				3.4
14	260	8.3	220	---				3.4
15	240	9.0	230	---				3.5
16	220	7.2	---	---				3.5
17	210	7.0						3.5
18	200	5.6						3.5
19	220	5.2						3.2
20	230	5.4						3.3
21	240	5.0						3.3
22	250	4.3						3.2
23	350	3.7						3.0

Time: 60.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 30 seconds.

Table 52

Canberra, Australia (35.3°S, 149.0°E) July 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	260	3.5					2.4	3.0
01	260	(3.6)					3.0	3.0
02	260	(3.6)					3.4	3.0
03	260	3.5					3.4	3.0
04	250	3.8					3.2	3.2
05	230	3.4					3.2	3.2
06	220	(2.9)					3.3	(3.1)
07	230	3.8			---	(1.5)	2.7	3.4
08	220	6.0			110	2.1	2.4	3.6
09	230	6.6	220	---	100	2.6		3.6
10	240	6.9	210	(4.0)	100	3.0		3.5
11	240	7.3	210	(4.3)	100	3.1	3.1	3.5
12	260	7.4	210	(4.4)	100	3.1	3.5	3.4
13	250	7.6	210	(4.3)	100	3.1	3.5	3.5
14	250	7.7	210	4.2	100	3.0	3.9	3.5
15	240	7.5	210	4.0	100	2.8	3.4	3.4
16	220	7.0	210	---	100	2.3	3.6	3.4
17	210	6.2			---	<1.3	3.5	3.4
18	220	5.5					3.1	3.3
19	225	4.5					3.4	3.3
20	230	4.0					2.7	3.2
21	240	3.6					2.7	3.1
22	250	3.5					2.7	3.0
23	250	3.4						3.0

Time: 150.0°E.
Sweep: 1.0 Mc to 16.0 Mc in 1 minute 55 seconds.

Table 53*

Falkland Is. (51.7°S, 57.8°W) July 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	380	2.6					2.8	2.6
01	370	2.7					2.9	2.6
02	360	2.7						2.7
03	350	2.6					2.7	2.7
04	340	2.7						2.8
05	310	2.7						3.0
06	280	2.4						3.2
07	290	2.4						3.0
08	230	4.5					2.6	3.5
09	230	5.4			160	2.4	2.8	3.5
10	230	6.1			140	2.5	3.4	3.5
11	240	6.5			140	2.7	3.7	3.4
12	240	7.0			140	2.7	4.4	3.4
13	230	6.8			140	2.7	3.8	3.5
14	240	6.6			140	2.6	2.9	3.4
15	240	6.2			150	2.4	2.7	3.4
16	230	5.4					2.6	3.5
17	240	3.8					2.8	3.3
18	270	3.0					2.8	3.1
19	270	3.0						3.1
20	290	2.5						3.1
21	320	2.4						2.8
22	380	2.4						2.6
23	380	2.6					2.7	2.6

Time: 60.0°W.
Sweep: 2.2 Mc to 16.0 Mc in 1 minute.
*Average values except foF2 and fEs, which are median values.

Table 54

Townsville, Australia (19.3°S, 146.8°E) June 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	235	(3.3)					2.1	(3.4)
01	220	(3.5)					2.1	(3.5)
02	220	3.4					2.1	---
03	205	(3.4)					2.0	(3.5)
04	210	(2.9)					2.1	(3.2)
05	230	2.7					2.5	3.1
06	225	3.1					2.7	3.2
07	210	5.5			110	2.0	2.9	(3.6)
08	210	7.8			100	2.6		3.6
09	220	9.0	210	---	90	3.1		3.5
10	230	(9.0)	210	4.4	90	3.4		3.6
11	240	(8.5)	200	4.9	90	3.5		(3.5)
12	250	8.2	200	4.8	90	3.5	3.7	3.5
13	250	(8.5)	200	4.9	90	3.5	4.2	3.4
14	250	8.2	200	4.5	90	3.4	3.8	3.6
15	240	8.2	200	---	90	3.2	4.4	3.4
16	210	7.8	---	---	90	2.9	4.0	3.5
17	210	7.6			---	---	4.4	3.5
18	200	(6.2)					4.2	(3.6)
19	200	4.5					3.1	3.6
20	210	3.7					3.0	3.3
21	245	3.5					2.9	3.2
22	250	3.5					2.8	(3.3)
23	250	3.5					2.4	(3.2)

Time: 150.0°E.
Sweep: 1.0 Mc to 16.0 Mc in 1 minute 55 seconds.

Table 55

Buenos Aires, Argentina (34.5°S, 58.5°W) June 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	310	3.4						2.9
01	300	3.3						3.0
02	300	3.1						3.0
03	300	3.2						3.0
04	260	3.4						3.2
05	260	2.6						3.1
06	290	2.8						3.0
07	240	4.6						3.3
08	220	6.4			---	---		3.5
09	230	6.8	230	---	---	3.1		3.5
10	250	7.8	230	---	---	---		3.5
11	250	9.0	230	---	---	---		3.5
12	260	8.3	230	---	100	3.2		3.4
13	250	8.4	230	---	---	---		3.5
14	240	8.0	230	---	---	---		3.4
15	240	9.0	220	---	---	---		3.5
16	220	8.0			---	---		3.5
17	210	7.0						3.5
18	200	5.4						3.3
19	240	5.2						3.2
20	240	5.2						3.2
21	240	4.7						3.3
22	250	3.8						3.3
23	290	3.4						3.0

Time: 60.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 30 seconds.

Table 56*

Falkland Is. (51.7°S, 57.8°W) J[illegible]

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
[illegible]	370	2.[illegible]						[illegible]
01	370	2.[illegible]						[illegible]
02	350	2.8						[illegible]
03	350	2.[illegible]						[illegible]
04	350	2.8						[illegible].7
05	320	2.8						2.[illegible]
06	280	2.7						3.0
07	280	2.6						2.9
08	230	4.5					2.[illegible]	3.4
09	230	5.5			150#	2.3	2.[illegible]	3.5
10	230	6.1			140	2.[illegible]	3.6	3.4
11	230	6.8			130	2.6	3.4	3.4
12	230	6.8			130	2.7	3.[illegible]	3.5
13	230	6.9			130	2.6	3.[illegible]	3.5
14	230	6.[illegible]			140	2.5	2.[illegible]	3.5
15	230	6.[illegible]				2.2#		3.5
16	220	4.6					2.[illegible]	3.5
17	260	3.5						3.1
18	270	3.1						3.1
19	270	2.8						3.1
20	290	2.6						3.0
21	300	2.6						2.[illegible]
22	350	2.6						2.7
23	370	2.8					2.8	2.6

Time: 60.0°W.
Sweep: 2.2 Mc to 16.0 Mc in 1 minute.
*Average values except foF2 and fEs, which are median values.
#One or two observations only.

Table 57

Buenos Aires, Argentina (34.5°S, 58.5°W) May 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	4.5						2.8
01	300	4.3						2.8
02	290	4.0						3.0
03	280	4.0						3.0
04	240	3.9						3.4
05	300	3.0						2.9
06	300	3.2						3.0
07	240	6.2						3.4
08	230	8.3	---	---				3.5
09	250	9.5	230	---	---	---		3.4
10	250	9.5	230	---	---	---		3.4
11	250	9.8	220	---	---	---		3.4
12	260	9.3	230	---	---	---		3.3
13	270	10.7	240	---	---	---		3.2
14	260	11.7	250	---				3.3
15	240	11.5	240	---				3.5
16	220	10.2						3.5
17	240	8.4						3.4
18	210	7.2						3.4
19	230	6.6						3.4
20	230	7.0						3.3
21	230	5.3						3.3
22	270	4.7						3.0
23	300	4.7						2.9

Time: 60.0°W.
Sweep: 1.0 Mc to 25.0 Mc in 30 seconds.

Table 58

Domont, France (49.0°N, 2.3°E) April 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	290	4.1						2.7
01	290	3.9						2.9
02	290	3.8						2.9
03	280	3.7						2.9
04	260	3.6			---	---		2.9
05	240	3.8	---	---	100	1.6		3.2
06	220	4.6	210	---	100	2.0		3.2
07	240	5.2	200	---	100	2.6		3.3
08	300	5.3	200	4.2	90	2.9		3.2
09	290	6.2	200	4.2	90	3.1		3.2
10	290	6.6	180	4.5	90	3.2		3.1
11	300	7.0	190	4.5	90	3.2		3.1
12	280	7.2	180	4.6	90	3.3		3.1
13	290	7.5	200	4.8	90	3.2		3.1
14	290	7.5	200	4.6	90	3.2		3.1
15	280	7.6	200	4.3	90	3.1		3.2
16	250	7.4	200	---	90	2.8		3.2
17	230	7.8	210	---	90	2.5		3.1
18	210	8.0	---	---	100	1.8		3.2
19	200	7.4			---	1.6		3.2
20	210	6.2						3.1
21	210	5.8						3.1
22	220	5.0						2.9
23	280	4.5						2.7

Time: 0.0°.
Sweep: 1.5 Mc to 16.0 Mc in 1 minute 30 seconds.

Table 59

Poitiers, France (46.6°N, 0.3°E) April 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	<330	4.6						2.6
01	330	4.2						(2.6)
02	<330	4.1						(2.7)
03	---	3.9						(2.7)
04	---	3.8						(2.7)
05	300	3.8						(2.9)
06	260	4.6						3.2
07	270	5.3	230	3.9				(3.2)
08	295	5.5	220	4.2				3.2
09	300	6.4	225	4.5				3.2
10	300	6.5	220	4.6				3.1
11	330	7.0	210	4.7				3.0
12	300	7.0	225	4.7				3.0
13	320	7.2	210	4.6				3.0
14	300	7.4	230	4.7				3.0
15	280	7.4	230	4.4				3.1
16	280	7.4	230	---				3.2
17	260	7.5	230	---				3.1
18	260	8.0	---	---				(3.1)
19	240	7.5						---
20	260	7.0						(3.0)
21	260	5.8						(2.7)
22	280	5.1						(2.7)
23	<320	4.9						(2.6)

Time: 0.0°.
Sweep: 3.1 Mc to 11.8 Mc in 1 minute 15 seconds.

Table 60

Terre Adelie (66.8°S, 141.4°E) April 1951

Time	h'F2	foF2	h'F1	foF1	h'E	foE	fEs	(M3000)F2
00	300	4.9	250	3.5	145	1.5	1.5	
01	300	5.2	250	3.5	130	2.2	1.5	
02	300	5.5	250	3.6	130	1.9	1.5	
03	300	5.6	250	3.5	140	2.3	1.5	
04	300	5.6	250	3.5	150	2.3	1.5	
05	300	5.7	250	3.3	150	1.5	1.5	
06	275	6.0	250	3.2	140	1.5	1.5	
07	270	5.5	250				1.5	
08	255	5.4					1.5	
09	255	5.5					1.5	
10	250	5.5					1.5	
11	255	5.0					2.0	
12	260	3.6					1.5	
13	300	3.5					1.5	
14	300	3.0					1.5	
15	300	2.6					1.5	
16	300	2.5					1.5	
17	310	2.4					1.5	
18	310	2.8					1.5	
19	300	2.5					3.6	
20	305	2.6					3.8	
21	305	3.0					2.2	
22	290	3.7	260				1.5	
23	275	5.0	250	(3.7)			1.5	

Time: 0.0°.
Sweep: 1.5 Mc to 16.3 Mc in 1 minute.

Form adopted June 1946

TABLE 61

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D. C.

IONOSPHERIC DATA

h'F2 (Characteristic), Km (Unit), December (Month), 1951

Observed at Washington, D. C.

Lat 38.7°N, Long 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: Mc. C, H.C.C., E.J.W.

Calculated by: Mc.C., H.C.C.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	(280)A	(270)S	(300)S	(280)A	250	270	(300)S	(280)A	230	(260)A	230	250	240	260	250	260	230	230	220	220	(230)S	250	280	270
2	280	260	300	(290)S	300	260	270	260	240	240H	270	270	250	260	260	250	230	230	230	(230)S	(250)S	(280)S	270	(260)S
3	(280)S	(280)A	260	260	260	(250)S	(300)S	260	240	240	250	250	250H	270	250	250	230	220	230	210	270	(300)S	(290)S	(300)S
4	(280)S	(290)S	(310)S	300	280	290	250	240	230	240	260	260	260	250	250	250	230	(250)A	220	240S	230	250	(260)S	(280)S
5	280	280	260	240	220	(240)S	240	240	220H	220	230	230	(240)L	240	230	230	220	210	230	220	230	260	(270)S	(260)S
6	(250)S	(290)S	(270)S	270	250S	240	(240)S	(240)A	220H	210H	230	250	240	240	250	240	220	210	240	240	(240)A	(230)S	(290)S	(280)A
7	(270)S	280S	(280)S	260	250	(250)S	(260)S	240	230	240	230	230	250	240H	(250)L	240	240	220	220	240	240	270	(300)S	320
8	(330)A	(280)A	(290)A	240	320	340	(330)S	270K	260K	270H	300K	320K	290kH	290K	270K	270K	250K	230K	230K	240K	230kH	(280)kS	(300)kA	(310)kS
9	310K	280K	270K	240K	280K	E K	E K	300K	260K	260K	360K	330K	310K	290K	280K	270K	240K	260K	230K	240K	270K	270K	270K	290K
10	290K	(300)kS	(300)kS	260K	320K	S K	S K	270K	240	250	240	250	250	250	250	230	230	230	240	230	250	(260)S	(270)S	(270)S
11	290	(320)S	(280)S	290S	S	S	S	280	240	250	260	270	250	250	C	C	C	220	240	250	(270)S	280	280	270
12	290	B	B	(280)S	(290)S	(290)F	290	240	230	250	240	260	250	250	240	240	220	220	280	220	230	(250)S	(280)A	280
13	(310)S	(220)S	(310)S	(300)S	(210)S	270	(280)S	240	220	240K	250K	250K	240K	240K	240K	240K	220K	220K	240K	(230)kS	A K	A K	(310)H	(280)S
14	280	(290)S	280	300S	300	(290)S	(270)S	240	220	220	250	240	230	240	240	230	230	230	260	250	280	(300)S	280	250
15	250	250S	(280)S	270	280	310	260	230	220	220	240	250	250	250	250	250	220	210	230	(230)A	240S	(290)S	280	280
16	280	(290)S	260	230	280	(280)A	A	A	A	L	230	240	240	240	240	240H	230	(230)A	220	C	C	A	A	A
17	A	A	A	A	(260)A	250	(260)S	240	220	230	230	260	240	250	260	240J	220	230	220	240	240	270	(300)A	270
18	290	280	260	250	260	280	(270)S	260	250	240	[260]A	270	250	250	260	240	230	210	220	240	240	270	300	290
19	(300)A	280	[260]A	250	280	240	(260)S	250H	240	[240]A	250	280	260	250	270	250	220	220	230	230	270	280	290	(290)S
20	280	290	(280)S	250	230	260	(300)S	260	230	220	250	260	250	250	260	280	220	210	(250)A	(230)A	230	S	A	(310)S
21	(290)S	(270)S	270	250	A	A	A	(240)A	(210)A	A	A	L	230	230	250	230	220	210	220	210	230	(280)A	(280)S	(300)S
22	(320)S	(310)S	(320)S	(280)S	250	250	250	270	240	240	(260)L	270	260	270	260	250	230	220	(240)A	(230)A	220	270	210	(210)S
23	(260)S	(270)S	(340)A	(300)S	270	240	300	300	210	240	(250)A	230	(250)L	(250)A	250	240	220	210	210	230	230	(300)A	(290)S	(290)S
24	280	270	270	270	280	280	240	250	210	210	230	240	230	230	250	230	210	210	220	220	230	240	(270)S	270
25	280	(290)S	280	250	250	230	240	230	220	220	220	240	230	230	260	240	220	220	C	C	C	(290)S	(320)S	300
26	300	290	270	270	280	260	230	(230)S	220	220	240	240	250	240H	260	240	210	210	230	230	(260)A	(290)S	(330)S	(310)S
27	[320]S	330	290	280	260	220	(230)S	260	230	230	250	250	250	250	240	240	210	(230)A	230	(260)A	240	(320)S	240	(260)A
28	[290]kA	310K	340K	340K	290K	220K	320K	320K	320K	G K	G K	380K	470K	480kH	450K	(300)kL	280K	230K	(220)kS	(250)kS	(250)kS	(280)kS	(300)kS	S K
29	A K	A K	(270)kS	[260]kS	250K	S K	S K	250K	220	230	(230)L	250	230H	240	240	230	220	(220)A	220	220	210K	(250)kS	A K	A K
30	A K	A K	A K	S K	(250)kS	(260)kS	(300)kS	(250)S	230	220	230	240	240	230	250	250	220	210	230	220	(220)S	(260)S	(270)S	(270)S
31	300F	(290)A	[300]A	(300)S	A	A	A	A	240	250	300	280	280	260	260	250	240	220	(230)A	[260]A	(290)S	(290)A	(320)S	[300]S
Median	280	(280)	(280)	270	260	260	270	250	230	240	250	250	250	250	250	240	220	220	230	230	240	280	280	280
Count	28	27	28	29	28	26	25	29	30	29	30	30	31	31	30	30	30	31	30	29	28	28	28	27

Sweep 1.0 Mc to 25.0 Mc in 2.25 min

Manual ☐ Automatic ☒

Form adopted June 1946

TABLE 62

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D.C.

IONOSPHERIC DATA

foF2 (Characteristic), Mc (Unit), December (Month), 1951

National Bureau of Standards (Institution)

Observed at Washington, D.C.

Lat 38.7°N, Long 77.1°W

75°W Mean Time

Scaled by: McC, E.J.W.

Calculated by: McC., H.C.C.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	3.3	2.9	(3.0)S	3.2	2.8F	2.5F	2.3F	3.8F	7.0	3.4	9.0	10.0	10.0	9.2	8.6	9.2JS	9.0S	8.2	7.0	6.0JS	(5.1)PF	(3.9)JF	4.2JF	4.5F
2	4.5F	4.2F	3.8S	3.7SF	3.8SF	3.7F	3.7SF	4.0	6.6	7.2H	9.2	10.1	9.4	9.4	10.0	9.8	8.8	7.7	6.3	4.6F	3.5F	4.3S	4.1S	4.1JS
3	3.4F	3.2F	3.0F	(2.9)FP	(2.7)FP	(2.6)FP	(2.2)F	(4.4)PF	6.9S	7.5	8.4	9.1	8.8H	10.0	9.4	9.8S	9.0	7.5	7.0S	5.2S	3.7S	3.6S	3.8	3.7JS
4	3.7	3.5	3.5	3.6	3.4	3.4	3.2	3.4	5.8S	7.0	8.8F	10.0	10.0	9.8	9.2	9.4	9.2	9.3S	8.2JS	6.6	5.1S	3.0F	3.0JF	3.0F
5	(3.6)PF	(4.6)PF	4.8JF	4.5	4.1	3.4	3.1	4.3	6.3JS	7.5	8.3	9.6	8.7	8.7	8.0	7.9	8.2	6.1S	6.5	5.4	4.1JS	3.2S	3.2JS	3.0
6	2.8	2.5	2.6V	2.8F	3.0	2.9F	2.7JF	3.7	6.2H	6.2FH	6.9	8.6	8.8	8.6	8.6	8.5	7.6	6.6F	5.5	5.4S	4.4	3.0	2.8F	2.8F
7	2.8FS	2.7F	3.2VS	3.1	3.1	3.0	2.9	3.6	6.0	6.6	7.3	7.6	9.0	8.6H	8.6	9.2S	9.5S	8.4	6.4	6.3	4.5FS	3.2F	3.2F	3.0F
8	3.7JS	4.1S	3.9	3.3V	3.0	3.0	3.0S	3.6K	4.2FK	5.3FK	5.6FK	6.0FK	K6.6HS	7.7K	7.4SK	8.4K	9.0SK	8.8K	5.5SK	K5.7JS	3.5HK	2.9FK	K3.4ZF	2.3FK
9	2.9K	3.6SK	K4.1JS	3.7SK	2.3FK	EK	EK	2.7FK	4.3FK	4.7FK	5.6K	6.0K	6.7K	7.4K	7.0FK	7.6SK	6.8SK	6.5K	5.8SK	3.8K	3.0K	2.9JK	3.1K	2.8K
10	2.5FK	K2.4JF	2.5FK	2.0FK	1.6K	1.6FK	K[1.7]FS	1.9FK	4.9	6.0	8.0	8.0	9.0	8.4	8.4F	8.0	7.8	6.9	6.0S	5.1	3.7S	3.0	3.0F	3.0F
11	2.8F	2.6F	2.8F	1.9F	1.9F	(1.7)JF	1.7JF	2.9	4.9	5.9	7.0	8.5	9.3	9.4	C	C	C	5.9JS	5.1	3.7S	3.1	2.9F	2.8F	2.5F
12	2.3F	(1.9)S	(1.9)PJ	2.1F	(2.3)JF	(2.3)FP	(2.7)F	(3.7)FP	5.4F	6.7	7.3	8.9	8.5	8.2	7.3	7.6	7.0	6.4S	(5.4)S	5.2	3.0	2.8	2.8	2.7
13	2.4	2.2JF	2.4	2.8	2.8	2.5F	2.6F	3.6FS	5.6	6.5K	7.0K	7.5K	8.0K	6.8K	6.7K	7.2K	6.6K	6.0K	4.5SK	4.0SK	AK	AK	2.7	3.0
14	2.9	2.9	2.9	3.1	3.5	3.7	3.7S	4.1S	5.3S	6.0	8.0	8.8	8.4	8.0	8.4	7.7	7.3S	5.6	5.9S	5.0	4.7	3.7S	3.9S	4.1V
15	4.4FJ	3.9S	3.9	3.7	3.6V	3.5	3.9	4.0	5.7	6.0	8.0	8.4	8.6	8.8V	8.4	8.5	8.8	7.0	6.0	5.1S	3.1BS	2.8F	3.1F	2.8F
16	3.2F	2.7F	(4.4)JF	(3.2)PF	2.9F	2.8F	A	A	5.8	6.5	7.6	8.0	8.6	8.0	8.2	7.4H	7.3	6.4	5.6	C	C	A	(3.0)A	3.1
17	3.1	4.2	3.5	3.5	4.1	3.3	3.2	3.2J	6.0	6.4	8.0	10.0	9.3	9.8	8.8	9.4	9.4	8.7	8.1	6.0S	4.3	4.0S	3.5S	3.5SF
18	3.5S	3.8F	3.8F	3.7F	3.1F	3.0F	2.8F	3.1F	5.7SF	6.6	7.3	9.0	9.7	9.4	9.8	9.6	9.2	8.1	7.0	5.0	4.1S	3.3	3.0	3.9
19	3.5S	3.5F	(3.3)A	3.3	3.2F	3.5F	(2.8)JF	2.9FH	6.0	6.5	8.2	9.6	9.6	9.4	9.2	10.0	8.4	7.8	5.2FS	4.5F	3.0F	3.1F	2.9JF	2.8F
20	3.2F	3.5JF	3.3F	3.4F	3.1F	2.5F	(2.5)F	3.4	(6.2)S	7.2	8.2	9.6	9.8	8.8	9.6	9.3	8.3	7.0F	5.7S	4.5F	3.1F	(2.2)PF	(2.2)A	2.2
21	2.3F	2.3F	2.4F	2.5F	2.2PA	A	A	(3.8)PA	5.9S	(7.0)F	7.6F	9.0	9.0	8.4F	9.8	9.4	8.4	6.6SF	6.4	5.8	3.6	3.0	2.6	2.5F
22	2.6	2.8	2.9F	3.2F	3.5S	3.2F	3.0	3.0F	5.2	6.4SF	7.3	9.2	9.4	9.8	10.4	10.5	9.6	9.6	9.3	6.7	5.4	4.5FS	2.4F	2.5F
23	2.6F	2.7	2.5V	2.4F	2.4F	2.4F	1.7F	(2.7)F	5.8	8.0	9.0	10.0	9.4	9.0	10.0	9.0	8.4	7.2S	5.8	4.7F	3.3F	2.7	2.5	2.4
24	2.5F	2.8	2.5F	2.3F	2.7F	3.0F	3.1F	3.4F	5.9	7.0	8.5	9.0	9.2	7.8	9.3	9.0	7.0S	6.0S	5.6S	4.7S	3.4SF	3.0F	2.9F	2.5F
25	2.5F	2.5F	2.8F	2.9F	3.3SF	3.3F	3.3SF	3.5F	5.8	6.6	7.2	9.0	7.6	7.6	8.5	8.8	8.4	7.2	C	C	C	(2.2)PS	2.1F	2.3F
26	2.4F	2.7F	2.8F	3.0	3.0	3.6	3.7	3.7	5.6	6.2	8.0	8.4	8.6	8.2H	8.2	9.0	7.4	6.8	5.7	4.6	2.8F	2.4	2.2F	2.2
27	2.2	3.2FZ	3.2ZF	3.3F	3.5	3.7F	3.3	3.2	5.8	6.7	8.4	9.2	8.8	8.2	9.3	9.0	7.6	6.6	5.8	4.2JS	3.6S	3.2SF	4.0S	3.0F
28	AK	FK	FK	(5.0)FK	K(4.2)JF	(5.2)FK	3.3K	2.5FK	2.9K	<3.1GK	<3.3GK	4.8K	4.6K	4.5HK	4.7K	4.6K	5.0K	5.0K	3.6K	3.0K	2.7FK	2.2FK	2.2K	1.9K
29	AK	AK	1.7K	2.0K	2.1FK	2.0FK	K1.9JH	2.6K	5.3	6.5	7.4	8.8	9.6H	8.8	8.0	7.4	7.4	5.7	5.4	4.9	3.0SK	2.1K	AK	AK
30	AK	AK	AK	(1.9)PK	2.0FK	K(1.9)PS	K(1.6)PS	2.7	5.2	7.8	7.4	7.8F	8.1	7.6	7.5	8.4	8.3	6.0	5.5	5.5S	3.6	2.8	2.6FS	2.6F
31	2.6F	2.7F	2.3	2.3	A	A	A	A	4.6	5.5	6.5	8.0	8.7	8.8	9.8	9.2S	8.8	7.7J	6.4	3.9S	3.0	2.7F	2.2F	1.8
Median	2.8	2.8	3.0	3.1	3.0	3.0	2.8	3.4	5.8	6.5	7.6	8.9	8.8	8.6	8.6	9.0	8.4	6.9	5.8	5.0	3.6	3.0	3.0	2.8
Count	28	28	29	31	30	29	28	29	31	31	31	31	31	31	30	30	30	31	30	29	28	29	30	30

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

Form adopted June 1946

TABLE 63

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D.C.

IONOSPHERIC DATA

foF2 (Characteristic), Mc (Unit), December (Month), 1951

Observed at Washington, D.C.

Lat 38.7°N, Long 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: Mc C., H.C.C., E. J. W.

Calculated by: Mc C., E. J. W., H.C.O.

Day	0030	0130	0230	0330	0430	0530	0630	0730	0830	0930	1030	1130	1230	1330	1430	1530	1630	1730	1830	1930	2030	2130	2230	2330
1	3.0	2.8	3.1	3.1	2.7 FS	2.4	2.5 F	5.8	7.0	8.6	9.0 H	10.4	9.4	8.8	9.0	9.0	8.8	8.1 S	(6.4) FS	5.0	3.8 F	3.7 F	4.0 F	4.4 F
2	4.5 F	3.8 S	4.0 F	3.8 FS	3.8 FS	3.7 JS	3.2 F	5.5	7.2	8.6	9.3	9.8	9.1	9.8	9.8	9.3 S	7.8 JS	6.6 F	5.6 FS	4.6 F	3.9 JS	4.1 JS	(4.5) PS	3.8 F
3	3.4 F	(3.1) F	(2.7) F	(2.7) FP	(3.0) PP	P (2.4) FS	(2.4) F	(5.8) S	7.3 S	8.2	8.8	9.2	9.3	9.6	9.7	9.3 S	8.0	7.0 S	6.1 VS	(3.8) S	3.5 S	3.6 S	3.7	3.7 S
4	3.6	3.3	3.3	3.5	3.5	3.3 F	3.2	5.2	6.8	7.0 F	9.2	10.0	10.0	9.2	9.2	9.3 S	8.7	9.3	7.1 S	6.0	F (4.4) PS	3.2 F	3.0 VF	(3.3) PF
5	4.1 JF	4.6 F	4.8	4.5	3.6	3.3 S	3.3	5.8 S	7.5	7.8	8.6	9.2	8.5	8.3	7.9	8.2	7.2	6.0	5.9	4.6	3.5	3.2	3.1	2.9
6	2.6	2.5	2.6	2.9	3.0 F	2.8 F	2.9 F	5.0	(7.2) HV	6.8 F	8.4	8.7	8.6	8.8	8.1	8.1	7.8 JS	5.7 S	5.5 S	5.3 S	4.1 S	(2.9) PF	2.9 V	2.8 F
7	2.7 FS	(3.0) V	(3.4) PV	3.1	3.1	2.9	2.9	5.2	6.3	6.8	7.7	8.3	8.5	8.4	9.2	9.4	9.0 S	7.5	6.1	5.2	3.4 JS	3.0 JF	3.0 F	3.5 S
8	4.2	4.0 S	3.6	3.0	2.9	2.9	3.4	4.1 K	5.2 K	5.3 K	5.8 K	6.6 K	6.7 K	8.4 K	8.2 K	9.0 SK	8.9 K	7.2 SK	5.4 SK	5.0 K	2.9 K	3.2 K	3.0 ZK	V 2.4 FK
9	2.9 K	4.0 SK	4.1 K	3.3 K	2.0 HK	J 1.5 AK	J 1.8 FK	J 3.8 SK	5.0 K	5.2 K	6.4 K	6.4 K	7.0 K	7.2 K	7.4 HK	J 7.4 SK	6.0 K	5.8 K	4.3 FK	3.3 K	3.0 K	3.2 K	2.9 HK	2.8 K
10	2.4 FK	Z 2.6 FK	2.6 FK	1.8 FK	1.6 K	F [1.8] SK	J (2.0) FK	4.1 K	5.4 SF	7.0	7.6	8.2 H	9.0	9.0	8.2	8.4	7.5 S	6.4	6.0	(4.2) JS	3.4 S	3.0	3.2 H	2.9 F
11	2.6 F	2.7 F	2.7 YF	(1.5) S	1.8 F	1.6 JS	1.9	4.2	5.2 JH	6.3	7.9	9.2	9.0	C	C	C	C	5.5	4.2 S	3.5	3.0	3.0	2.7	2.3 F
12	2.1 F	(1.8) PS	(2.1) S	(2.1) FP	2.3 F	(2.5) F	(3.8) F	(5.2) PF	6.2	7.2	7.5	8.6	7.6	7.3	7.8	7.2	(6.3) S	5.8	5.3	4.2 JS	2.9 S	2.7	2.7	2.6 F
13	2.4 F	2.3 F	2.6	3.1 JS	2.8 F	2.6 F	2.8 F	5.0	6.2	6.8 K	7.2 K	7.8 K	7.2 K	7.2 K	6.6 K	6.6 K	6.4 K	4.9 SK	P (4.7) SK	P (3.3) AK	[3.0] AK	2.7 K	2.9	3.0
14	2.8	2.9	3.0	3.3	3.6	3.8	3.7 S	4.9 V	5.8	6.8	8.3	9.5	8.1	8.1	7.5	7.4 S	6.1 S	5.5	5.6	4.6	4.1	3.9	4.1	4.2 F
15	(4.2) JS	3.6	4.1	3.6	2.5	3.8	3.8	4.7	7.0	7.4	7.7	9.0	8.4	8.3	8.5	9.0	7.6	6.4	6.0	3.9	2.8	3.0 F	3.1 F	3.0
16	2.7 F	(3.8) FJ	(4.3) FJ	2.8 F	3.0 F	2.7 J	[3.6] A	4.5	6.4	7.0	7.7	9.0	8.4 H	7.2	7.9	7.3 S	7.2 S	5.8	C	C	C	(3.0) A	3.1	3.2
17	[3.6] A	3.9	[3.4] A	(3.4) A	3.5	3.3	3.3	4.7	6.3	(7.9) F	8.4	9.9	10.0	9.2	9.6	9.3	9.0 S	8.4	(7.2) S	5.2	4.0	3.8	3.8	3.3 F
18	3.8 SF	4.1	3.7	3.2 F	3.1 F	2.9 F	2.6 F	4.1	5.7	6.5	8.0	9.8	9.0 F	9.2	9.4	9.6	9.2 S	7.4 S	5.4 S	4.5	3.3	3.3	3.0 F	3.4 S
19	3.5 S	3.3 F	3.5	3.4 JF	3.6	3.3 F	2.4	4.7	6.6	[6.8] A	7.8	10.0	9.6	9.0	9.2	9.2	8.2	6.4	5.0 S	3.1 F	3.0 SF	3.0 F	2.5 F	2.7 F
20	3.1 F	3.4 JF	3.4 F	3.3 F	2.7 F	(2.4) SF	2.6 F	(5.0) SF	7.0	[7.7] M	9.0	9.8	8.8	[9.2] C	9.3	8.8 S	7.8 JS	5.8 JF	5.2 S	4.4 JS	2.9	P (2.2) AF	2.1	2.4 S
21	2.5 SF	2.3 F	2.4 F	3.4 F	F A	A	A	5.2 F	7.5	7.0	7.9	9.6	8.3 F	9.0	9.3	9.0	8.1	6.0 F	6.3 S	4.2 JS	3.2	2.7	2.6	2.4 S
22	2.6 F	3.0 SF	3.5 V	3.4 F	3.4 F	3.4 SA	2.6 F	4.6	6.2	7.1	8.4	9.1	9.0	10.4	10.4	10.0	9.6	8.6	8.8	6.0 F	5.0	2.4	2.9 F	2.6 F
23	2.7 F	2.4	2.3 JF	2.3 F	2.6 F	2.8 F	1.7 F	5.0	6.6	7.0	8.4	9.6	9.0	9.4	9.0	8.8 S	7.8 S	6.8	5.4 S	4.0	2.8	2.5	2.4	2.5 F
24	2.7	2.6 F	2.4 F	2.5 F	2.8 F	3.2 F	3.0 F	5.0	6.0 F	7.6	8.4	9.2	8.1	8.2	8.7	8.6	6.4	6.0 S	5.6 S	4.0 S	3.3 F	2.9 F	2.8 F	2.5 F
25	2.5 F	2.7 F	2.7 F	3.8 F	3.5 SF	3.2 F	3.2 F	4.6 F	6.9	7.2 S	8.4	8.6	8.2	7.6	9.0	8.3	7.0	6.0 S	C	C	C	2.1 F	2.1 F	2.3 F
26	2.5 F	2.9 F	2.9 F	3.0 F	3.3	3.8	3.4	5.0	5.8	7.2	8.4	8.3	7.8	7.4	8.4	8.1	6.5	6.4	5.2	3.1 F	2.4 F	2.1 F	2.2 F	2.2
27	2.3 F	3.5 FZ	3.3 F	3.3 F	3.9	3.5 F	3.0	4.5	6.1	7.0	8.7	8.9	8.5 JS	8.9	9.5	8.2	6.8	6.7	5.1 S	4.2 J	3.2	(4.0) JS	3.3	2.4 F
28	A K	F K	F K	J 5.4 FK	(5.0) FK	3.5 FK	2.0 FK	3.0 K	<3.1 GK	<3.3 GK	4.4 K	3.9 K	4.6 K	4.3 K	4.8 K	4.6 K	5.1 K	4.3 K	3.3 K	2.8 FK	2.4 FK	2.2 FK	1.8 K	A K
29	A K	A K	1.7 K	2.0 FK	2.0 FK	2.0 HK	1.9 K	4.2 K	5.8	7.1	8.0	9.2	9.4	8.2	8.0	7.4	6.5	5.8	5.2	3.8	2.4 K	E K	S (1.8) PK	A K
30	A K	A K	P (1.9) AK	2.0 K	2.0 K	1.9 K	1.9 K	4.1 S	5.8 F	7.6	7.0	8.6	7.2	7.8	7.9	8.8	7.5	5.8	5.7 S	4.9 S	3.2	2.6 PS	2.6 S	2.7 FS
31	2.8 J	2.4 F	2.2 F	2.4	A	A	A	A	5.1 J	6.1	7.4	8.6	9.2	9.1	9.4	9.2	8.1	5.4 F	5.0 S	3.0	3.0	2.5	[2.0] A	2.0
Median	2.8	3.0	3.0	3.1	3.0	2.9	2.9	4.8	6.2	7.0	8.0	9.1	8.5	8.6	8.8	8.8	7.7	6.0	5.5	4.2	3.2	3.0	2.9	2.8
Count	28	28	30	31	29	29	29	30	31	31	31	31	31	30	30	30	30	31	29	29	29	30	31	29

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

TABLE 64

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D.C.

Form adopted June 1946

IONOSPHERIC DATA

h'F1 (Characteristic), Km (Unit), December (Month), 1951

Observed at Washington, D.C.

Lat. 38.7°N, Long 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: McC., H.C.C., F.J.W.

Calculated by: McC., H.C.C.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1										A	(210) H	230	(200) H	230	230	Q										
2										Q	240	230	230	230	240	240										
3										Q	220	230	220	220	240	240										
4									210 H	230	210	230	230	230	230	240										
5										210	220	200	200	220	Q	Q										
6										Q	220	(200) B	B	B	240	220										
7										210	200	210	240	(220) A	230	230										
8										240 K	230 K	220 K	240 K	250 K	250 K	250 K										
9										230 K	H 230 K	240 K	260 K	240 K	250 HK	250 K										
10										220	220	210	(230) B	230	210	Q										
11									230	230	200	230	(240) B	230	C	C										
12										230	220 H	210	240	210	220	220										
13										210 K	200 K	200 K	200 HK	210 HK	220 K	220 K										
14										Q	200	210	220	210	230	Q										
15										A	A	B	B	(240) B	B	B										
16										A	Q	230	[230] B	230	220 H	A										
17										Q	220	200	[200] A	210	210	L										
18										230	A	A	A	230	(240) A	Q										
19										Q	A	A	250	230	230	220 H										
20										Q	240	[240] A	240	(230) A	230	220										
21										A	A	210	220	210	220	Q										
22										230	210 H	220	220	220 H	230	240										
23										Q	Q	230	220	[220] A	220	230										
24										Q	220	210	(230) B	210	Q	Q										
25										Q	210	230	230	230	240	230										
26										200	230	230	220	220 H	220 H	A										
27										Q	230	A	A	230	210	240										
28										300 K	270 K	230 HK	250 K	230 KH	240 K	250 K										
29										200	200	200	200	210	200	200										
30									Q	210	210 H	210	[200] A	200	230	220										
31										230	220	210 H	220	220	220 H	230										
Median									—	230	220	220	230	220	230	230										
Count									2	16	25	27	27	30	27	19										

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

TABLE 65

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D. C.

Form adopted June 1946

IONOSPHERIC DATA

foFl (Characteristic), Mc (Unit), December (Month), 1951

National Bureau of Standards (Institution)

Observed at Washington, D.C.

Scaled by: Mc C., E.J.W.

Lat 38.7°N, Long 77.1°W

75°W Mean Time

Calculated by: Mc C., H.C.C.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										A	L	L	L	L	L	Q								
2										Q	L	L	L	L	L	L								
3										Q	L	L	L	L	L	L								
4									L	L	L	L	L	L	L	L								
5										L	L	L	L	L	Q	Q								
6										Q	L	L	L	B	L	L								
7										L K	L K	L K	L K	L K	L K	L K								
8										L K	L K	4.0 K	L K	L K	L K	L K								
9										L	(3.9) L	3.9	4.0	3.7	L	L								
10										L	L	L	L	L	L	Q								
11									L	L	L	L	L	L	C	C								
12										L	L	L	L	L	L	L								
13										L K	L K	3.7 K	[3.7] K L	(3.6) P K	L K	L K								
14										Q	3.5	L	L	L	L	Q								
15										L	L	L	L	L	L	L								
16										A	Q	L	L	L	L	A								
17										Q	L	(4.0) P	L	L	L	L								
18										L	A	L	3.4	L	L	Q								
19										Q	A	A	L	L	L	L								
20										Q	L	L	L	L	L	L								
21										A	A	L	L	L	L	Q								
22										L	L	L	L	L	L	L								
23										Q	Q	L	L	A	L	L								
24										Q	L	L	L	L	Q	Q								
25										Q	L	L	L	L	L	L								
26										L	L	L	L	L	L	L								
27										Q	L	L	L	L	3.3	L								
28										3.2 K	3.3 K	3.8 H K	4.0 K	4.0 H K	3.8 K	L K								
29										L	L	L	L	L	L	L								
30										L	L	L	L	L	L	L								
31										L	L	L	(4.1) L	L	L	L								
Median									—	—	—	3.9	4.0	—	—	—								
Count										1	3	5	5	3	2									

Sweep 1.0 Mc to 25.0 Mc In 0.25 min

Manual ☐ Automatic ☒

Form adopted June 1946

TABLE 66

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D.C.

IONOSPHERIC DATA

h'E (Characteristic), Km (Unit), December (Month), 1951

Observed at Washington, D.C.

Lat 38.7°N, Long 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: Mc C., H.C.C., E.J.W.

Calculated by: Mc C., H.C.C.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									120	[120] A	(130) A	(120) A	120	120	120	120								
2									110	(110) A	110 H	110	110	120	110	120	(130) S							
3									A	(110) A	110	(120) A	120	110	110	120	130 H							
4									110	110	110	110	110	110 H	A	A	(120) S							
5									110 H	100 H	100	100	(110) B	(120) A	110	120 B								
6									120 H	A	B	B	B	B	(130) B	(130) B	B							
7									(130) S	120 H	120 H	[110] A	100	[100] A	100	(100) A								
8										120 HK	(120) AK	120 K	120 HK	120 HK	120 HK	120 K	130 HK							
9									130 K	120 K	120 K	130 K	130 K	(120) BK	(120) BK	[120] BK	(120) BK							
10									120	(120) B	[120] B	(120) B	B	B	(120) B	120	130 H							
11									110	120 H	120	130	[130] B	130	C	C	C							
12									(130) S	(130) B	(120) B	130	120	130	120	120	130							
13									110 H	110 K	(100) AK	110 K	(120) BK	(120) BK	110 K	100 K	A K							
14									(120) S	110	(100) A	100	110	110	110 H	(110) S	130							
15									B	(120) B	A	B	B	B	B	B	B							
16									A	A	100	[110] A	(120) B	(120) B	120	(120) B	A							
17									(120) S	A	A	A	A	(110) A	120	[110] A	110							
18									A	110	120	120	110	120	(120) A	(110) A	110							
19									A	130	A	A	110	(110) A	A	A	A							
20									A	A	A	A	A	A	100 H	110	A							
21									A	A	A	100	A	A	A	A	A							
22									140	110 H	130	120	120	110	100 H	110								
23									140 H	120	[120] A	(120) A	A	A	110	110	A							
24									A	(130) A	100	100	(130) B	120	120 H	130								
25									140 H	120 H	110	130	110	110	110 H	110	(110) A							
26									140	110	(110) A	120	110	120	120	110	120							
27									(100) A	(120) A	110	A	A	100	110	110	A							
28									130 K	110 K	110 K	110 K	110 K	110 K	110 K	120 K	120 K							
29									120	120 H	(100) A	100	110	110	100 H	A	A							
30									S	(120) B	110 H	(110) B	[110] A	(110) B	(110) B	(110) B	S							
31									A	A	120	(120) B	120	110 H	110 H	B	B							
Median									120	120	110	120	110	110	110	120	120							
Count									20	25	25	25	23	25	26	24	13							

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

TABLE 67

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D.C

IONOSPHERIC DATA

Form adopted June 1946

foE (Characteristic), Mc (Unit), December (Month), 1951

Observed at Washington, D.C.

Lat 38.7°N, Long 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: Mc C., H.C.C., E.J.W.

Calculated by: Mc C., H.C.C.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									A	A	3.0^{H}	3.0	3.1	3.0	2.7	2.5								
2									2.1	(2.6)^{A}	(2.8)^{H}	3.0	3.0	3.0	2.8	2.4	2.0^{H}							
3									A	A	2.8	(3.0)^{P}	3.0	2.9	2.7	2.3	2.1^{H}							
4									2.0	2.4	2.7	3.0	[illegible]	(3.0)^{H}	[2.7]A	(2.5)^{H}	2.1							
5									(2.1)^{H}	[illegible]		3.0	[illegible]	(3.0)^{P}	2.7	(2.5)^{H}								
6									[illegible]	[illegible]	[illegible]	B	[illegible]	[illegible]	[illegible]	[2.5]^{S}	[illegible]							
7									[illegible]	[illegible]		A^{K}		[illegible]	[illegible]	[illegible]								
8										[illegible]		2.8	[illegible]	[illegible]	[illegible]	2.3^{K}	[illegible]							
9									[illegible]	[illegible]		2.8	[illegible]	[illegible]		[illegible]	[illegible]							
10									[illegible]	[illegible]	[illegible]	3.0		A	[illegible]	2.3	[illegible]							
11									[illegible]		[illegible]	2.8^{K}	[illegible]	[illegible]		[illegible]	[illegible]							
12									[illegible]	[illegible]	[illegible]	3.0	[illegible]	[illegible]	[illegible]	2.4	[illegible]							
13									[illegible]	[illegible]	[illegible]	3.0^{A}	[illegible]	[illegible]	[illegible]	2.3	A							
14									[illegible]	[illegible]	[illegible]	3.0	[illegible]	[illegible]	[illegible]	(2.2)	(1.7)							
15									B	[illegible]	[illegible]	B	[illegible]	[illegible]	[illegible]	B	A							
16									A	A	[illegible]	A	[illegible]	[illegible]	2.7	(2.2)^{A}	A							
17									[illegible]	A	A	[illegible]	[illegible]	[illegible]	2.8	[2.4]^{A}	[illegible]							
18									A	[illegible]	[illegible]	2.6	[illegible]	[illegible]	A	A	B							
19									A	[illegible]	[illegible]	A	[illegible]	[illegible]	A	A	A							
20									A	2.3	[illegible]	2.9^{A}	[illegible]	[illegible]	[illegible]	2.3	A							
21									B	A	A	B	[illegible]	A	A	A	A							
22									[illegible]	2.5^{A}	[illegible]	3.0	[illegible]	2.9	2.7^{H}	2.5								
23									2.0^{H}	2.4	[illegible]	3.0	[illegible]	A	2.8	2.5	[illegible]							
24									A	2.6^{H}	[illegible]	3.0	[illegible]	2.8	2.7^{H}	2.5								
25									1.7	2.4^{H}	2.8	3.1	3.0	3.0	2.8^{H}	2.6	2.1							
26									2.0	2.4	2.8	3.0	3.1	3.1	2.9	2.5	2.1							
27									A	2.6^{H}	2.8	A	A	3.0	3.0	2.4	A							
28									1.8^{K}	2.4^{K}	2.6	2.8^{K}	3.0^{K}	2.9^{K}	2.7^{K}	2.4^{K}	2.0^{K}							
29									1.9	2.4^{H}	(2.8)	2.9	3.0	2.9	2.6^{H}	2.5^{H}	A							
30									S	2.4	2.7	B	A	B	B	B	S							
31									A	A	2.6	2.9^{H}	(2.9)^{P}	3.0	(2.8)^{P}	B	B							
Median									2.0	2.4	2.7	3.0	3.0	2.9	2.7	2.4	2.0							
Count									17	23	26	22	21	24	25	24	14							

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

TABLE 68

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D. C.

Form adopted June 1946

IONOSPHERIC DATA

Es (Characteristic), Mc Km (Unit), December (Month), 1951

Observed at Washington, D.C.

Lat 38.7°N, Long 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: Mc C., H. C. C., E. J. W.

Calculated by: Mc C., H. C. C.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	38 110	E	E	2.9Y 120	66H 120	4.3H 120	96Y 110	6.2 120	3.5 130	8.6 110	3.5 110	2.3 110	G	G	G	G	E	E	E	E	E	24Y 110	E	E.
2	E	E	E	E	E	E	2.3 120	E	G	9.6Y 110	3.6 140	G	G	G	G	G	G	E	E	E	E	E	E	E
3	30 120	37 120	E	E	23Y 120	E	(2.7)H 120	8.8 110	170Y 120	3.3Y 120	G	26 110	G	G	G	G	G	E	E	E	E	E	28 110	E
4	E	E	E	E	E	E	2.8Y 110	2.5Y 140	G	G	G	G	G	3.1 110	3.8Y 110	5.8 100	G	2.0 110	29Y 110	E	3.7 110	E	E	E
5	E	E	E	E	E	E	E	E	G	G	G	G	G	31 100	G	G	E	E	36Y 120	E	E	E	E	E
6	E	E	E	E	E	E	E	4.9Y 100	G	24 100	B	B	B	B	G	G	G	E	1.8 120	29Y 110	4.3 120	E	E	3.7 120
7	E	E	E	E	E	E	E	E	G	54Y 120	G	30Y 100	G	34 100	28Y 100	2.3 100	2.1 100	E	E	E	E	E	E	E
8	3.1 110	3.2 110	3.2 110	25 120	E	E	E	E	3.2H 130	G	2.9 120	G	G	G	G	G	G	E	E	E	E	7.2H 120	4.0 120	E
9	E	E	E	E	E	E	5.4 120	E	G	G	G	G	G	G	G	G	G	E	E	E	E	E	E	E
10	E	E	E	6.0Y 100	E	E	E	34 110	G	G	B	G	B	B	G	G	G	E	E	E	E	E	E	E
11	E	E	E	3.1YH 140	2.7Y 130	E	E	E	G	G	G	G	B	G	C	C	C	E	E	E	E	E	2.9Y 110	E
12	E	E	E	E	E	E	E	E	G	G	G	G	G	G	G	G	G	E	E	E	E	E	38 100	E
13	E	E	E	E	30Y 110	54YH 110	2.2 110	3.0 110	5.0Y 110	G	3.1 100	G	G	G	G	G	20 100	30 100	31Y 110	51Y 110	55 100	52 110	32 110	27Y 110
14	2.6Y 110	94Y 110	E	E	E	E	E	E	2.1 130	5.6Y 100	3.6 100	G	G	G	G	2.1 130	G	E	E	E	E	E	E	E
15	E	E	E	E	E	E	E	2.9Y 120	G	2.8 120	35B 120	B	B	B	B	B	B	E	E	38 110	E	E	26Y 110	E
16	E	E	E	E	26 110	2.6 110	8.0 100	7.2 100	7.5 100	11.0 100	6.8Y 100	2.9H 120	G	G	G	31 120	42H 110	50 110	49Y 110	C	C	50 110	37 100	30 100
17	3.2 110	4.4 110	5.2 110	4.0Y 110	3.3 110	E	E	E	G	50 100	2.8H 100	30 110	8.0Y 100	31 110	2.3 110	G	G	2.8 110	3.3 110	31 100	E	E	3.0 120	2.3 130
18	E	E	E	2.8 110	E	E	22 110	E	2.5Y 120	2.6 130	5.8 120	7.0H 120	32 120	3.2 120	31 120	2.8 110	G	E	E	E	E	E	28 100	3.0 110
19	2.3 120	2.7 110	74 110	3.3 110	E	E	2.9 120	E	3.8 120	74 120	9.0 120	76Y 110	G	56 110	3.0 110	29 110	24 110	19 110	E	E	E	2.3 110	E	E
20	E	E	E	E	E	E	E	10.8 110	3.2 110	4.2 120	4.4 110	5.0H 100	50H 100	48 100	40 120	36YH 120	3.5YH 100	30H 100	38 100	3.2 110	37 110	31Y 110	34 110	26Y 110
21	2.8Y 110	E	2.3Y 110	155 110	33 100	4.3 100	4.8 100	4.3 100	4.8 100	6.8 100	5.6 100	G	34 100	3.0 100	4.2 100	38Y 100	27 110	2.0 110	E	26 110	E	54 120	E	E
22	E	E	E	E	2.3 120	74H 120	3.2 120	E	4.0Y 110	G	G	G	G	G	G	G	E	E	5.2 100	7.4 100	20 100	33H 140	56Y 100	E
23	E	2.9 140	2.9Y 140	E	E	E	E	E	G	G	10.5H 110	31 110	66 110	7.0 110	G	G	2.3 100	1.9 110	25Y 110	2.9 110	3.2H 100	37 100	27 100	E
24	E	E	E	1.4 110	1.7 110	2.9 110	17 110	4.2 110	37H 100	3.2Y 100	G	7.4Y 110	92Y 130	G	G	2.5 100	E	23Y 100	E	E	E	E	29H 120	E
25	E	E	E	E	E	E	E	E	G	G	G	G	G	G	G	G	28 110	3.4 110	C	C	C	E	E	E
26	E	E	E	E	E	E	E	E	G	G	2.7 110	G	7.0Y 100	G	G	4.0Y 120	30 130	27H 100	36 100	50H 110	10.6 100	2.1Y 110	E	E
27	E	E	E	1.7Y 110	E	2.8Y 110	2.2 110	3.1Y 110	1.7 100	2.2 120	G	6.7Y 100	6.1 100	G	G	G	3.7Y 100	50 100	45 100	74H 100	70 130	E	E	33Y 120
28	5.0 120	E	2.2 130	E	E	4.0Y 110	E	E	G	G	G	G	G	G	68Y 110	68Y 110	E	E	E	E	E	E	E	E
29	32 100	4.6 100	E	E	E	E	E	E	G	2.3 110	2.9 100	G	G	G	G	2.1 100	34Y 100	33 100	2.9H 100	2.3 130	E	E	33 120	34 120
30	32 110	3.2 110	3.2Y 110	1.7Y 110	1.8Y 110	E	E	E	G	G	G	G	60H 90	G	G	G	24Y 120	E	E	E	E	E	21Y 110	35 110
31	37Y 130	3.1 130	6.6 120	E	6.4 110	70 110	8.0 110	90 110	58Y 100	2.8Y 120	G	G	G	G	G	B	B	E	3.7 110	5.3 110	42Y 110	33 100	48 110	E
Median	**	**	**	**	**	**	**	**	**	2.3	**	**	**	**	**	**	**	**	**	**	**	**	2.1	**
Count	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	30	31	30	29	29	31	31	31

** MEDIAN fEs LESS THAN MEDIAN foE, OR LESS THAN LOWER FREQUENCY LIMIT OF RECORDER

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

Form adopted June 1946

TABLE 69

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D.C.

IONOSPHERIC DATA

(M1500)F2 (Characteristic), ____ (Unit), December (Month), 1951

Observed at Washington, D.C.

Lat 38.7°N, Long 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: Mc C., E. J. W.

Calculated by: Mc C., H.C.C., E. J. W.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	2.2	1.9	(1.8)S	2.0	2.0F	2.0F	2.0F	2.1F	2.3	2.3	2.3	2.3	2.3	2.2	2.2	(2.2)JS	2.2S	2.1	2.1	(2.1)JS	(2.0)PF	(2.0)JF	(1.9)JF	1.9F
2	1.9F	2.0F	1.9S	1.8SF	1.8FS	1.9F	2.0FS	2.0	2.4	2.2H	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.2F	2.0F	1.8S	2.0S	(2.0)JS
3	2.1F	2.2F	2.1F	(2.1)FP	(2.1)FP	(2.1)FP	(2.1)F	(2.0)PS	2.3S	2.3	2.2	2.2	2.0H	2.1	2.1	2.2S	2.2	2.2	2.2S	2.3S	1.9S	1.8S	1.9	(1.9)JS
4	1.9	1.8	1.8	1.8	1.8	1.8	2.1	2.1	2.3S	2.3	2.1F	2.2	2.2	2.1	2.2	2.1	2.2	2.1S	(2.2)JS	2.1	2.2S	2.1F	(2.0)JF	2.1F
5	(1.9)PF	(1.9)PF	(2.1)JF	2.1	2.3	2.1	2.1	2.3	(2.5)JS	2.6	2.5	2.4	2.3	2.4	2.4	2.3	2.4	2.2S	2.2	2.2	(2.3)JS	2.1S	(2.0)JS	2.0
6	2.1	1.9	2.0V	2.1F	2.1	2.2F	(2.3)JF	2.3	2.5H	2.6FH	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.1F	2.1	2.2S	2.3	2.3	2.0F	2.0F
7	2.1FS	2.1F	2.0VS	2.1	2.0	2.0	2.0	2.1	2.4	2.3	2.3	2.3	2.3	2.1H	2.1	2.0S	2.2S	2.2	2.1	2.3	2.1FS	2.0F	1.9F	1.7F
8	(1.7)JS	2.0S	2.0	2.0V	1.8	1.7	1.7S	2.1K	2.1FK	2.2FK	2.1FK	2.1FK	K2.1HS	2.1K	2.0SK	2.0K	2.1SK	2.2K	2.0SK	K(2.1)JS	2.2HK	1.9FK	K2.0F	1.9FK
9	1.8K	1.9SK	K(2.0)JS	2.1SK	2.0FK	E K	E K	2.0FK	2.1FK	2.2FK	1.9K	1.9K	2.0K	2.0K	1.9FK	2.0SK	2.1SK	2.1K	2.1SK	2.1K	2.0K	(2.1)JK	2.0K	1.9K
10	2.0FK	K(1.9)JF	1.9FK	2.1FK	1.8K	1.9FK	S FK	2.0FK	2.3	2.2	2.2	2.4	2.3	2.1	2.2F	2.2	2.3	2.2	2.1S	2.3	2.2S	2.0	2.0F	2.0F
11	2.0F	1.9F	2.0F	2.1F	1.8F	(1.6)JF	(1.9)JF	2.0	2.4	2.3	2.1	2.2	2.2	2.2	C	C	C	(2.3)JS	2.2	2.1S	1.9	2.1F	2.0F	2.2F
12	2.0F	S B	B	2.0F	(2.0)JF	(1.9)PF	(2.0)F	(2.1)FP	2.3F	2.3	2.4	2.3	2.3	2.4	2.4	2.3	2.4	2.3S	(2.1)S	2.4	2.2	2.1	2.1	2.1
13	2.3	(1.9)JF	1.9	1.9	2.1	2.0F	1.9F	2.1FS	2.4	2.4K	2.3K	2.3K	2.3K	2.4K	2.4K	2.2K	2.2K	2.4K	2.0SK	2.2SK	A K	A K	1.9	2.0
14	2.0	1.9	1.9	1.9	1.8	1.8	2.0S	2.1S	2.4S	2.5	2.3	2.3	2.4	2.3	2.4	2.4	2.4S	2.3	2.0S	2.6	2.0	1.8S	2.0S	1.9V
15	(2.1)FJ	2.0S	1.9	1.9	1.9V	1.8	2.1	2.3	2.4	2.5	2.5	2.2	2.3	2.3V	2.2	2.2	2.2	2.3	2.1	2.3S	2.3BS	2.0F	2.0F	2.0F
16	1.9F	2.0F	(2.0)JF	(2.3)PF	2.0F	2.1F	A	A	2.4	2.5	2.4	2.2	2.4	2.2	2.1	2.2H	2.3	2.2	2.2	C	C	A	(2.0)A	1.9
17	1.9	2.0	2.0	2.0	2.1	2.0	2.0	(2.2)J	2.5	2.1	2.3	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.2S	2.0	2.0S	1.9S	1.9SF
18	1.9S	2.0F	2.0F	2.0F	2.0F	1.9F	2.0F	2.1F	2.2SF	2.2	2.4	2.2	2.2	2.2	2.1	2.1	2.1	2.3	2.1	2.2	2.1S	2.0	1.9	1.9
19	1.9S	2.0F	(1.9)A	2.0	2.0F	2.0F	(2.0)JF	1.9FH	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.1FS	2.2F	2.0F	2.0F	(1.9)JF	1.9F
20	2.0F	(1.9)JF	2.0F	2.1F	2.0F	2.0F	(2.0)F	2.1	(2.3)S	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.3F	2.1S	2.3F	2.3F	(2.0)PF	(1.9)A	2.0
21	2.0F	2.2F	2.2F	2.3F	2.1AF	A	A	(2.1)PA	2.5S	(2.4)F	2.4F	2.2	2.4	2.1F	2.3	2.3	2.3	2.2SF	2.1	2.4	2.1	2.1	2.0	1.9F
22	1.8	1.8	1.8F	1.9F	1.9S	2.1F	2.2	2.1F	2.3	2.2SF	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.3	2.2	2.0FS	1.9F	1.9F
23	2.0F	2.0	1.8V	1.9F	2.0F	2.2F	1.9F	(1.9)F	2.4	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.3	2.2S	2.2	2.3F	2.3F	2.0	1.9	2.0
24	1.9F	2.0	2.0F	2.0F	2.0F	2.0F	2.1F	2.1F	2.3	2.5	2.3	2.4	2.5	2.4	2.3	2.3	2.4S	2.3S	2.3S	2.3S	2.2SF	2.1F	2.1F	2.0F
25	2.0F	2.0F	2.0F	2.1F	2.0SF	2.1F	2.2SF	2.2F	2.4	2.5	2.2	2.2	2.4	2.3	2.2	2.3	2.5	2.3	C	C	C	(2.0)PS	1.9F	2.0F
26	1.9F	2.0F	2.0F	2.0	2.1	2.0	2.2	2.0	2.5	2.3	2.4	2.3	2.4	2.3H	2.3	2.3	2.5	2.1	2.3	2.3	2.2F	1.9	1.8F	2.0
27	1.8	1.8EZ	2.1ZF	2.0F	2.0	2.2F	2.2	2.1	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.4	2.3	2.1	2.3	(2.1)JS	2.0S	1.8SF	2.1S	2.3F
28	A K	F K	F K	(1.6)FK	K(1.9)FJ	(2.2)FK	1.8K	1.9FK	1.9K	G K	G K	1.9K	1.7K	1.7HK	1.7K	2.0K	2.1K	2.1K	2.0K	2.0K	2.1FK	1.9FK	1.9K	2.0K
29	A K	A K	2.0K	2.0K	2.1FK	2.0FK	K(2.1)JH	2.0K	2.5	2.3	2.3	2.3	2.2H	2.3	2.3	2.4	2.4	2.2	2.2	2.3	2.5SK	2.1K	A K	A K
30	A K	A K	A K	(2.1)PK	2.2FK	K(2.1)PS	K(1.9)PS	2.0	2.5	2.5	2.5	2.3F	2.5	2.1	2.3	2.2	2.4	2.2	2.1	2.2S	2.2	2.1	2.1FS	2.0F
31	1.9F	2.0F	1.9	1.8	A	A	A	A	2.1	2.2	2.1	2.1	2.0	2.0	2.2	2.2S	2.3	(2.4)J	2.3	2.4S	1.8	2.1F	1.9F	1.8
Median	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.4	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.1	2.2	2.2	2.0	2.0	2.0
Count	28	27	28	31	30	28	26	29	31	31	31	31	31	31	30	30	30	31	30	29	28	29	30	30

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

Form adopted June 1946

TABLE 70

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D.C.

IONOSPHERIC DATA

(M3000)F2, ______ (Characteristic) (Unit) December (Month), 1951

Observed at Washington, D.C.

Lat 38.7°N, Long 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: Mc C., E. J. W.

Calculated by: Mc C.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	3.2	2.8	(2.8)S	2.9	3.0F	2.9F	3.0F	3.1F	3.4	33	3.3	33	33	32	3.2	(3.2)JS	32S	3.1	31	(31)JS	(30)PF	(30)JF	(2.9)JF	29F
2	29F	3.0F	2.8S	2.7SF	2.7FS	2.9F	3.0FS	3.0	3.4	3.2H	3.2	32	32	31	31	3.2	32	32	31	3.2F	3.0F	27S	2.9S	(30)JS
3	3.1F	32F	32F	(32)FP	(3.1)FP	(31)FP	(3.1)F	(30)PJ	3.4S	33	3.2	32	3.0H	3.1	31	3.2S	3.2	3.2	32S	3.3S	2.8S	2.8S	2.8	(28)JS
4	2.8	2.8	2.7	2.7	2.7	2.7	3.1	3.1	3.4S	33	31F	3.2	32	31	32	31	3.2	3.2S	(32)JS	3.1	3.2S	31F	(30)JF	3.2F
5	(2.9)PF	(28)PF	(31)JF	32	3.4	31	3.1	34	(3.5)JS	36	36	34	33	34	3.4	34	3.5	3.2S	3.2	32	(33)JS	31S	(3.0)JS	30
6	3.1	29	2.9V	31F	31	33F	(3.4)JF	34	36H	37FH	33	34	3.2	34	33	3.3	3.3	3.1F	31	32S	3.3	33	29F	30F
7	3.1FS	31F	3.0VS	3.1	3.0	3.0	3.0	3.1	3.5	34	3.3	3.3	3.3	31H	31	3.0S	3.2S	32	3.1	33	3.1FS	30F	29F	26F
8	(2.7)JS	29S	30	3.0V	2.7	26	2.6S	31K	3.1FK	32FK	31FK	3.1FK	K3.1HS	3.1K	3.0SK	30K	3.1SK	3.2K	30SK	K(31)JS	3.2HK	2.8FK	K30FZ	2.9FK
9	27K	2.9SK	K(30)JS	3.1SK	3.0FK	E K	E K	3.0FK	3.1FK	32FK	2.8K	2.9K	29K	3.0K	28FK	3.0SK	31SK	3.1K	31SK	31K	2.9K	(31)JK	30K	29K
10	3.0FK	K(2.8)JF	28FK	3.1FK	28K	2.9FK	S FK	3.0FK	33	32	3.2	3.4	33	31	32F	32	3.4	3.2	31S	33	3.2S	30	30F	30F
11	29F	28F	3.0F	31F	27F	(25)JF	(28)JF	30	3.5	3.4	3.1	32	32	32	C	C	C	(33)JS	32	3.1S	2.9	31F	3.0F	3.2F
12	30F	S B	B	3.0F	(30)JF	(29)FP	(29)F	(31)FP	3.4F	34	35	3.4	33	35	3.4	3.4	34	34S	(31)S	3.4	3.2	3.1	3.1	31
13	3.3	(2.8)JF	2.8	2.8	3.0	30F	2.9F	31FS	3.4	3.4K	3.3K	34K	3.3K	35K	34K	33K	33K	34K	29SK	32SK	A K	A K	28	30
14	30	29	28	2.8	27	2.7	30S	31S	34S	3.5	3.4	3.3	34	34	34	34	34S	33	3.0S	30	2.9	2.7S	2.9S	29V
15	(31)FJ	3.0S	28	2.8	2.8V	27	30	3.4	35	36	3.6	3.2	33	34V	33	32	3.3	3.3	31	3.3S	3.0BS	30F	30F	30F
16	2.9F	3.0F	(2.9)JF	(34)PF	30F	3.1F	A	A	35	3.6	3.5	3.2	35	33	31	3.3H	3.3	32	33	C	C	A	(29)A	29
17	2.9	3.0	30	3.1	31	30	3.0	(3.3)J	35	31	34	3.4	33	32	31	31	31	31	3.1	32S	2.9	3.0S	28S	2.9SF
18	29S	3.0F	30F	30F	30F	28F	29F	31F	3.2SF	3.2	34	3.2	32	32	31	31	3.1	33	3.1	32	31S	3.0	28	28
19	2.9S	30F	(29)A	30	30F	30F	(3.0)JF	2.9FH	3.5	33	33	32	3.2	32	32	32	3.2	3.3	31FS	3.2F	30F	3.0F	(29)JF	29F
20	30F	(29)JF	29F	31F	30F	30F	(3.0)F	31	(3.3)S	34	33	3.4	33	32	33	33	34	34F	31S	34F	34F	(30)AF	(29)A	2.9
21	3.0F	33F	32F	34F	31FA	A	A	(3.1)PA	3.6S	(3.4)F	3.4F	32	3.5	31F	33	33	3.3	3.2SF	31	35	3.1	31	29	29F
22	2.8	27	27F	29F	28S	31F	32	3.1F	34	32SF	3.1	31	3.0	3.0	30	31	3.1	3.0	3.1	33	32	3.0FS	2.9F	2.8F
23	30F	30	2.7V	29F	3.0F	32F	2.9F	(2.9)F	34	34	34	3.2	33	32	3.2	32	33	32S	32	3.4F	33F	3.0	28	29
24	29F	30	3.0F	3.0F	3.0F	30F	31F	31F	34	36	33	34	35	34	34	33	35S	33S	3.3S	3.4S	3.2SF	31F	30F	3.0F
25	2.9F	3.0F	3.0F	31F	30SF	3.1F	32SF	32F	35	36	3.2	3.2	3.4	34	32	33	3.5	34	C	C	C	(30)PS	28F	3.0F
26	29F	30F	30F	30	3.1	30	32	3.0	36	3.4	35	3.4	35	34H	33	3.3	3.6	3.1	33	3.4	3.2F	2.9	2.8F	3.0
27	2.8	27FZ	31ZF	2.9F	30	32F	3.2	3.1	3.4	34	33	3.4	32	32	33	35	34	3.1	33	(3.1)JS	30S	27FS	31S	34F
28	A K	F K	F K	(25)FK	K(28)FJ	(32)FK	27A	2.8FK	2.9K	G K	G K	2.9K	2.5K	26HK	2.6K	3.0K	31K	31K	3.0K	30K	31FK	29FK	29K	3.0K
29	A K	A K	3.0K	30K	3.1FK	30FK	K(3.1)JH	3.0K	35	3.4	34	33	32H	33	34	35	3.5	3.2	33	34	35SK	31K	A K	A K
30	A K	A K	A K	(32)PK	32FK	K(31)PS	K(28)PS	30	3.5	3.5	3.6	3.4F	36	31	3.3	32	3.5	33	31	3.2S	3.2	31	3.1FS	30F
31	2.9F	30F	29	2.7	A	A	A	A	3.1	3.2	31	3.1	3.0	3.0	3.2	32S	33	(35)J	34	34S	2.8	3.1F	29F	27
Median	2.9	3.0	30	30	30	30	30	3.1	34	34	33	32	33	32	32	32	33	32	31	3.2	3.1	3.0	29	3.0
Count	28	27	28	31	30	28	26	29	31	31	31	31	31	31	30	30	30	31	30	29	28	29	30	30

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

Form adopted June 1946

TABLE 71

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D.C.

IONOSPHERIC DATA

(M3000)F1 (Characteristic), ______ (Unit), December (Month), 1951

Observed at Washington, D.C.

Lat 38.7°N, Long 77.1°W

75°W Mean Time

National Bureau of Standards (Institution)

Scaled by: McO., H.C.C., E.J.W.

Calculated by: McC., H.C.C.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1										A	L	L	L	L	L	Q								
2										Q	L	L	L	L	L	L								
3										Q	L	L	L	L	L	L								
4									L	L	L	L	L	L	L	L								
5										L	L	L	L	L	Q	Q								
6										Q	L	L	L	B	L	L								
7										L	L	L	L	L	L	L								
8										L K	L K	3.5 K	L K	L K	L K	L K								
9										L K	(3.4) LK	3.4 K	3.5 K	3.6 K	L K	L K								
10										L	L	L	L	L	L	Q								
11									L	L	L	L	L	L	C	C								
12										L	L	L	L	L	L	L								
13										L K	L K	3.9 K	L K	(3.9) PK	L K	L K								
14										Q	4.0	L	L	L	L	Q								
15										L	L	L	L	L	L	L								
16										A	Q	L	L	L	L	A								
17										Q	L	(3.8) P	L	L	L	L								
18										L	A	L	4.1	L	L	Q								
19										Q	A	A	L	L	L	L								
20										Q	L	L	L	L	L	L								
21										A	A	L	L	L	L	Q								
22										L	L	L	L	L	L	L								
23										Q	Q	L	L	A	L	L								
24										Q	L	L	L	L	Q	Q								
25										Q	L	L	L	L	L	L								
26										L	L	L	L	L	L	L								
27										Q	L	L	L	L	4.2	L								
28										3.2 K	3.5 K	3.4 HK	3.4 K	3.3 HK	3.2 K	L K								
29										L	L	L	L	L	L	L								
30										L	L	L	L	L	L	L								
31										L	L	L	(3.6) L	L	L	L								
Median									—	—	—	3.6	—	—	—	—								
Count										1	3	5	4	3	2									

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

TABLE 72

Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D. C.

IONOSPHERIC DATA

Form adopted June 1946

(M 1500) E (Characteristic), ______ (Unit), December (Month), 1951

Observed at Washington, D. C.

Lat. 38.7°N, Long 77.1°W

75° W Mean Time

National Bureau of Standards (Institution)

Scaled by: Mc C., H. C.C., E. J.W.

Calculated by: Mc C., H.C.C.

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1									A	A	3.6H	4.0	4.1	4.2	4.1	4.2								
2									4.0	(4.1)A	(4.2)H	4.3	4.1	4.1	4.1	4.2	3.8H							
3									A	A	3.8	(3.9)P	4.1	4.0	4.2	4.0	3.7H							
4									3.8	4.0	4.0	3.9	3.9	(4.0)H	A	(4.0)H	4.1							
5									(4.1)H	4.0H	4.0	4.0	4.0	(4.0)P	4.2	(4.3)H								
6									(3.6)H	A	B	B	B	B	(4.2)B	B	B							
7									(4.0)H	4.1	3.8H	A	B	A	(4.1)A	4.2								
8										4.0K H	3.9K	4.0K	3.9K H	4.0K H	4.3K H	4.2K	(3.6)K H							
9									3.9K	3.6K	3.7K	3.8K	3.9K	(3.8)K P	4.1K	B K	B K							
10									3.9	4.1	B	3.9	B	B	(4.2)P	4.1	3.8H							
11									4.0	4.1H	4.2	4.2	B	4.1	C	C	C							
12									4.0H	B	4.1	4.1	4.0	4.1	4.1	4.1	4.1							
13									3.8H	4.3K	(4.0)K A	4.0K	(4.1)K B	4.1K	4.1K	4.3K	A K							
14									(4.1)A	(4.4)A	A	4.1	4.2	4.3	4.3H	(4.4)S	(4.3)S							
15									B	(4.2)B	A	B	B	B	B	B	B							
16									A	A	(4.0)P	A	B	4.2	4.3	(4.5)A	A							
17									S	A	A	A	A	3.9	4.2	A	3.9							
18									A	4.0	4.2	4.5	4.4	4.3	A	A	B							
19									A	A	A	A	4.2B	4.1	A	A	A							
20									A	A	4.1A	4.1A	4.2A	4.2A	4.4H	4.4	A							
21									A	A	A	B	A	A	A	A								
22									4.0	3.8H	3.8	3.9	4.1	4.3	4.1H	4.1								
23									3.7H	3.9	A	3.9	A	A	4.0	4.1	4.0							
24									A	3.7H	3.8	4.0	(4.0)B	4.2	4.1H	4.0								
25									4.1H	3.7H	3.9	3.8	4.1	4.0	3.9H	4.0	3.7							
26									3.3	4.0	3.9	4.2	4.1	4.1	4.1	4.2	3.9							
27									A	3.4H	4.1	A	A	4.3	4.1	4.4	A							
28									4.2K	4.1K	4.2K	4.0K	3.8K	4.2K	4.2K	3.8K	4.2K							
29									4.0	4.3H	(4.2)A	4.2	4.2	4.3	4.4H	4.4H	A							
30									S	4.1	4.2	B	A	B	B	B	S							
31									A	A	4.1	4.2H	(4.0)P	4.2	(4.1)P	B	B							
Median									4.0	4.0	4.0	4.0	4.1	4.1	4.1	4.2	3.9							
Count									17	21	23	22	20	24	24	21	12							

Sweep 1.0 Mc to 25.0 Mc in 0.25 min

Manual ☐ Automatic ☒

Table 73

Ionospheric Storminess at Washington, D. C.

December 1951

Day	Ionospheric character* 00-12 GCT	Ionospheric character* 12-24 GCT	Principal storms Beginning GCT	Principal storms End GCT	Geomagnetic character** 00-12 GCT	Geomagnetic character** 12-24 GCT
1	2	1			3	2
2	1	1			3	2
3	1	1			2	2
4	2	1			3	3
5	1	2			2	2
6	2	2			1	2
7	2	1			2	2
8	2	4	1200	----	5	4
9	4	5	----	----	4	4
10	4	3	----	1300	4	4
11	2	1			4	3
12	3	2			2	2
13	3	4	1400	----	2	1
14	3	2	----	0300	2	2
15	1	2			3	3
16	1	2			2	2
17	1	1			3	3
18	1	1			4	3
19	1	2			3	3
20	2	1			4	1
21	2	1			1	2
22	3	3			4	4
23	2	1			4	2
24	2	1			1	1
25	1	2			1	1
26	2	1			1	1
27	2	1			2	3
28	5	7	0500	----	5	4
29	5	3	----	1300	2	2
30	5	3	0100	1200	1	2
31	2	2			4	4

*Ionosphere character figure (I-figure) for ionospheric storminess at Washington, D. C., during 12-hour period, on an arbitrary scale of 0 to 9, 9 representing the greatest disturbance.

**Average for 12 hours of Cheltenham, Maryland, geomagnetic K-figures on an arbitrary scale of 0 to 9, 9 representing the greatest disturbance.

----Dashes indicate continuing storm.

Table 74

Provisional Radio Propagation Quality Figures
(Including Comparisons with CRPL Warnings and Forecasts)
November 1951

Day	North Atlantic quality figure Half day GCT (1)	(2)	CRPL* Warning Half day GCT (1)	(2)	CRPL** Forecasts (J-reports)	North Pacific quality figure Half day GCT (1)	(2)	Geomagnetic K_{Ch} Half day GCT (1)	(2)
1	6	5				Insufficient data received		1	2
2	7	5			X			3	2
3	5	(4)						(4)	3
4	(3)	(4)	U	W	X			(4)	3
5	(4)	5	W		X			3	3
6	6	(4)			X			3	3
7	(3)	5						(4)	3
8	(4)	6						2	2
9	5	5						3	2
10	6	7						1	1
11	7	7			X			0	2
12	6	5		U	X			(4)	2
13	6	5			X			(4)	(4)
14	5	(4)	U		X			(4)	(4)
15	(4)	(4)	U		X			(4)	3
16	(4)	(4)			X			3	2
17	5	5						2	(4)
18	5	5	U					3	1
19	5	5						2	2
20	5	5						2	3
21	5	5						2	2
22	6	6						3	3
23	5	5						3	3
24	6	6						2	3
25	6	6						3	3
26	7	5						1	3
27	5	6						1	2
28	7	6						2	(4)
29	6	(4)	U	U				(4)	3
30	5	5						3	2

Score:	Warning N.A.	Warning N.P.	Forecast N.A.	Forecast N.P.
H	7		9	
(M)	1		0	
M	8		4	
G	43		36	
O	1		11	

*Broadcast on WWV, Washington, D.C. Times of warnings recorded to nearest half day as broadcast. ( ) broadcast for one-quarter day. Blanks signify N.

**In addition to dates marked X, the following were designated as probable disturbed days on forecast more than three or four days in advance of said dates: November 3, 7, 8, 9.

Scales:
Quality Figures
(1)- Useless
(2)- Very poor
(3)- Poor
(4)- Poor to fair
5 - Fair
6 - Fair to good
7 - Good
8 - Very good
9 - Excellent

Geomagnetic K_{Ch} - 0 to 9, 9 representing the greatest disturbance; $K_{Ch} \geq 4$ indicates significant disturbance, enclosed in ( ) for emphasis.

Symbols:
W Disturbed conditions expected
U Unstable conditions expected
N No disturbance expected
X Probable disturbed date

Scoring:
H Storm ($Q \leq 4$) hit
(M) Storm severer than predicted
M Storm missed
G Good day forecast
O Overwarning

Scoring by half day according to following table:

	Quality Figure ≤ 3	4	5	≥ 6
W	H	H	O	O
U	(M)	H	H	O
N	M	M	G	G
X	H	H	O	O

Table 75a

Coronal observations at Climax, Colorado (5303A), east limb

Date GCT	Degrees north of the solar equator																		0°	Degrees south of the solar equator																	
	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
1951																																					
Dec. 1.7	-	-	-	-	-	-	-	-	-	-	2	2	3	3	5	8	12	8	10	12	15	12	15	15	12	3	2	2	2	2	2	3	2	-	-	-	-
3.7	-	-	-	-	-	-	-	-	-	2	3	3	5	5	8	8	2	3	3	3	3	3	8	5	2	-	-	-	-	-	-	-	-	-	-	-	-
7.7	-	-	-	-	-	-	-	-	-	-	3	3	8	12	14	12	15	8	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9.8	-	-	-	-	-	-	2	2	2	3	3	3	3	5	12	8	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12.7	-	-	-	-	-	2	3	3	3	3	2	2	5	8	8	5	15	12	10	3	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-
28.7	-	-	-	-	-	-	-	-	-	-	-	2	2	2	3	3	3	3	5	12	15	15	15	12	5	5	3	3	2	2	2	2	2	-	-	-	-

Table 76a

Coronal observations at Climax, Colorado (6374A), east limb

Date GCT	Degrees north of the solar equator																		0°	Degrees south of the solar equator																	
	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
1951																																					
Dec. 1.7	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	-	-	2	5	3	3	3	3	3	3	3	2	2	3	2	2	2
3.7	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	10	8	3	3	5	3	3	3	3	3	5	3	5	5	3	3	3	3	3	3	3
7.7	3	3	3	3	2	3	2	2	2	2	2	3	2	2	2	2	2	3	3	3	3	3	3	4	3	3	4	3	3	3	3	3	3	3	3	3	2
9.8	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	13	2	3	2	2	3	3	3	3	3	3	3	3	5	3	3	3	3	3	3	3	2
12.7	2	2	3	2	2	2	-	-	-	-	-	-	-	2	14	8	12	5	14	3	2	2	2	2	3	3	8	3	3	3	2	2	3	3	3	3	2
28.7	3	3	3	3	3	3	2	2	2	2	3	3	3	3	2	2	2	2	3	5	2	2	8	2	2	2	2	2	2	2	2	3	2	2	2	2	2

Table 77a

Coronal observations at Climax, Colorado (6702A), east limb

Date GCT	Degrees north of the solar equator																		0°	Degrees south of the solar equator																	
	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
1951																																					
Dec. 1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	3	3	3	3	3	2	2	2	2	2	2	-	-	-	-	-	-
3.7	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-
7.7	-	-	-	-	-	-	-	-	-	-	2	2	2	2	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9.8	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12.7	-	-	-	-	-	-	-	-	-	-	-	2	2	2	3	3	3	3	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	3	3	3	3	3	2	2	-	-	-	-	-	-	-	-	-	-

Table 75b

Coronal observations at Climax, Colorado (5303A), west limb

Date GCT	Degrees south of the solar equator																		0°	Degrees north of the solar equator																	
	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
1951																																					
Dec. 1.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2	3	10	8	10	15	18	20	8	10	8	3	2	3	5	2	-	-	-	-	-
3.7	-	-	-	-	2	2	2	2	2	2	2	2	3	3	5	5	10	8	8	8	8	10	10	10	8	8	8	8	3	3	5	8	3	-	-	-	-
7.7	-	-	-	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	12	20	22	15	8	5	5	5	3	5	3	3	2	2	-	-	-	-	-
9.8	-	-	-	-	-	-	-	-	-	-	3	3	3	3	3	3	3	5	8	10	10	10	5	3	3	3	3	3	2	2	2	-	-	-	-	-	-
12.7	-	-	-	-	-	2	3	3	2	2	3	5	3	3	5	8	10	8	5	10	5	5	3	3	3	3	3	2	2	2	2	2	-	-	-	-	-
28.7	-	-	-	2	2	2	2	2	2	3	3	3	3	3	3	3	3	10	12	15	18	13	15	8	5	2	2	2	3	8	8	3	2	-	-	-	-

Table 76b

Coronal observations at Climax, Colorado (6374A), west limb

Date GCT	Degrees south of the solar equator																		0°	Degrees north of the solar equator																	
	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
1951																																					
Dec. 1.7a	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	5	3	3	3	2	5	-	2	2	-	-	-	-	-	-	-	-	2	2	2	2	2
3.7	3	2	2	2	2	2	2	2	2	2	-	-	-	-	-	10	15	3	3	5	3	3	3	-	-	-	-	-	-	-	-	-	-	2	2	2	2
7.7	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	8	3	3	14	12	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3
9.8	2	2	2	2	2	2	2	2	2	3	3	2	2	2	2	3	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	3	3	3	3
12.7	2	2	2	2	2	2	2	3	5	3	2	2	2	2	2	2	13	5	2	2	3	3	3	2	2	2	2	2	2	2	2	2	2	2	3	2	2
28.7	2	2	2	2	2	2	2	2	2	2	2	2	3	3	5	3	8	10	10	10	22	2	2	-	-	-	-	-	2	2	3	3	3	3	3	3	3

Table 77b

Coronal observations at Climax, Colorado (6702A), west limb

Date GCT	Degrees south of the solar equator																		0°	Degrees north of the solar equator																	
	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
1951																																					
Dec. 1.7a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	2	3	3	3	3	-	-	-	-	-	-	-	-	-	-	-
3.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-
7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	3	3	3	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-
9.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-
12.7	-	-	-	-	-	-	-	-	-	2	2	3	3	3	3	2	2	3	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note 1. Yellow line (5694A): Dec. 1.7, possible trace of yellow line at N10, west limb.

Note 2. Climax coronal observations for November 1951 should be considered low weight.

Table 78

Particulars of Observations, Climax, Colorado
July - December 1951

Date GCT	Greenline threshold intensity at 45°	90°	135°	225°	270°	315°	Obs.	Meas.
1951								
Jul. 1.6	10	9	10	11	11	10	At.	W
2.7	13	12	13	15	15	15	A	W
3.6	14	14	14	15	14	14	At.	W
4.7	7	8	8	8	8	8	A	W
5.6	7	10	-	-	-	-	At.	W
6.6	11	10	11	14	12	10	A	W
7.6	12	13	13	14	14	13	At.	W
8.6	13	10	10	13	9	14	At.	W
9.7	12	13	13	14	15	15	A	W
11.9	>15	>15	>15	>15	>15	>15	A	W
13.6	8	8	8	7	7	7	At.	W
14.6	12	10	9	11	11	10	A	W
15.6	14	11	11	13	12	12	At.	W
16.6	11	11	10	-	10	-	A	W
18.7	3	4	6	4	4	4	At.	W
19.6	5	4	4	5	5	5	A	W
20.7	7	5	4	6	5	5	At.	W
21.6	6	10	5	6	5	5	A	W
22.9	9	6	6	15	7	7	At.	W
23.6	4	12	6	10	9	12	A	W
24.6	4	4	4	4	4	4	At.	W
25.6	8	8	7	8	7	8	A	W
26.6	9	8	8	9	8	9	At.	W
27.7	10	9	9	8	10	10	A	W
28.6	5	5	5	-	-	-	At.	W
29.7	5	5	5	6	5	6	A	W
30.8	15	11	10	8	7	9	At.	W
31.8	-	9	-	-	-	-	A	W
Aug. 1.7	12	13	13	12	12	10	At.	W
5.8	-	8	10	8	9	7	At.	W
6.9	-	13	15	-	-	-	A	W
7.6	7	7	8	8	8	8	At.	W
8.8	10	7	6	-	-	-	A	W
9.6	10	13	13	13	12	9	At.	W
10.8	-	11	>15	-	-	-	A	W
11.6	10	9	7	9	9	9	A	W
12.7	10	11	9	9	8	7	A	W
13.6	7	7	7	7	7	7	At.	W
14.7	6	12	7	6	6	7	A	W
15.6	10	9	10	10	8	8	At.	W
16.6	11	9	10	9	10	12	A	W
18.6	13	11	13	11	14	>15	A	W
19.7	11	10	11	-	8	10	A	W
22.9	7	9	7	-	-	8	A	W
23.7	8	8	7	14	10	12	At.	W
25.6	11	10	10	9	9	8	At.	W
26.6	12	11	12	12	11	11	At.	W
29.9	-	3	-	-	-	-	At.	W
30.9	3	2	2	14	3	>15	At.	W
31.6	2	4	3	2	2	3	At.	W
Sep. 1.6	2	2	2	3	2	3	A	W
2.6	5	4	4	3	4	4	At.	W
3.6	3	3	4	5	5	3	A	W
4.7	[illegible]	7	12	8	11	>15	A	W
5.6	10	11	13	10	14	10	At.	W
7.9	15	8	12	-	11	-	A	W
8.7	>15	16	>15	12	15	>15	A	W
9.6	7	9	7	6	8	7	A	W
Sep. 10.7	6	5	4	6	6	6	A	W
11.7	10	12	11	11	10	11	A	W
12.7	4	3	3	4	2	2	A	W
13.6	5	4	6	4	8	4	A	W
14.6	3	3	4	11	14	9	A	W
15.7	14	10	7	11	8	9	At.	W
16.6	13	4	6	11	13	13	At.	W
17.7	>15	14	13	10	10	11	A	W
18.6	10	8	8	10	10	11	At.	W
19.6	7	6	7	5	5	6	A	W
20.6	14	13	14	12	13	13	At.	W
22.7	11	11	12	11	11	10	At.	W
23.9	12	12	11	-	13	>15	At.	W
24.7	>15	14	12	>15	15	>15	At.	W
25.6	[illegible]	8	8	6	8	10	A	W
26.7	12	11	15	11	11	12	A	W
28.7	6	5	4	11	6	11	A	W
30.6	6	5	8	5	5	6	At.	W
Oct. 7.7	5	4	4	3	3	7	At.	W
8.6	5	4	5	5	3	7	A	W
9.6	6	3	2	8	6	6	A	W
10.6	4	5	6	9	6	8	At.	W
11.9	6	14	5	5	8	13	A	W
12.6	8	8	9	7	9	7	At.	W
14.0	9	6	13	7	10	10	A	W
14.9	3	3	4	4	4	4	A	W
15.7	6	5	5	5	4	5	A	W
20.8	-	10	>15	-	-	-	A	W
23.6	5	5	5	5	5	5	At.	W
24.6	10	8	8	9	8	10	A	W
25.7	10	8	7	11	10	11	At.	W
28.8	3	3	3	3	4	4	At.	W
29.8	7	4	7	9	2	2	At./A	W
30.7	2	2	3	4	3	4	A	W
31.7	5	5	5	12	3	5	At.	W
Nov. 2.8	5	5	5	>15	4	>15	A	W
3.8	8	14	8	10	10	15	At.	W
5.9	12	8	8	-	-	-	A	W
6.7	6	6	7	5	7	7	At.	W
7.6	4	3	3	3	4	4	A	W
9.6	4	3	5	5	6	7	At.	W
10.7	3	3	3	5	4	5	A	W
17.7	3	4	4	4	5	5	At.	W
18.7	5	6	5	8	5	11	At.	W
19.7	5	5	4	5	4	4	A	W
20.7	5	5	5	5	5	5	At.	W
21.7	9	9	7	-	8	-	A	W
25.9	-	4	8	-	-	-	At.	W
26.7	3	4	3	2	2	2	A	W
28.7	4	4	4	3	5	5	At.	W
29.7	5	5	3	5	6	6	A	W
30.7	5	7	6	10	7	11	At.	W
Dec. 1.7	6	3	4	6	4	5	A	W
3.7	6	6	6	6	6	6	At.	W
7.7	4	5	5	6	5	6	At.	W
9.8	4	3	5	4	4	5	A	W
12.7	4	5	4	4	5	5	A	W
28.7	5	5	5	5	6	5	At.	W

A - Allen
At- Athay
W - I. Witte

Table 79

Zürich Provisional Relative Sunspot Numbers

December 1951

Date	R_Z*	Date	R_Z*
1	32	17	59
2	24	18	63
3	15	19	62
4	18	20	68
5	14	21	76
6	34	22	102
7	41	23	106
8	54	24	66
9	42	25	45
10	22	26	29
11	22	27	27
12	28	28	41
13	31	29	43
14	26	30	50
15	40	31	68
16	49	Mean:	45.1

*Dependent on observations at Zürich Observatory and its stations at Locarno and Arosa.

Table 80

American Relative Sunspot Numbers

November 1951

Date	R_A'*	Date	R_A'*
1	64	17	62
2	51	18	56
3	50	19	60
4	60	20	51
5	65	21	45
6	56	22	42
7	43	23	56
8	36	24	62
9	59	25	79
10	72	26	74
11	63	27	71
12	54	28	63
13	43	29	70
14	48	30	45
15	61		
16	42	Mean:	56.8

*Combination of reports from 22 observers; see page 11.

Table 81

Solar Flares, November 1951

serva-ry	Date 1951	Time Observed Begin-ning (GCT)	Time Observed End-ing (GCT)	Dura-tion (Min)	Area (Mill) (of) (Visible) (Hemisph)	Position Lati-tude (Deg)	Position Long-itude Diff (Deg)	Time of Maxi-mum (GCT)	Int. of Maxi-mum	Rela-tive Area of Maximum (Tenths)	Import-ance	SID Obser-ved
.Peak	Nov. 7	1830	1906	36	45	S10	W90	1847	10	3	1 -	Yes
"	" 7	2000	2020	20	50	S15	W89	2011	8	2	1 -	
"	" 14	2040	2145	65	51	N12	W40	2111	9	5	1 -	
ath	" 28	1505				N05	W64	--			1	
.Peak	" 28	1605	1645	40	69	N12	W58	1628	13	5	1 -	

Sac.Peak = Sacramento Peak

Table 82

Indices of Geomagnetic Activity for November 1951

Preliminary values of mean K-indices, Kw, from 35 observatories;
Preliminary values of international character-figures, C;
Geomagnetic planetary three-hour-range indices, Kp;
Magnetically selected quiet and disturbed days

Gr. Day 1951	Values Kw	Sum	C	Values Kp	Sum	Final Sel. Days
1	0.9 0.5 1.2 1.8 1.3 1.0 1.7 3.1	11.5	0.3	1-0o1+2o 1+1o2o3-	11o	Five
2	2.9 3.0 2.4 2.3 2.9 2.8 2.6 3.0	21.9	0.8	3-4-3o3o 3o3-3-3-	23+	Quiet
3	3.1 3.7 3.2 3.3 4.0 2.9 3.7 4.6	28.5	1.2	4-5-5-4+ 4+3-4-5o	33o	
4	3.9 4.0 3.2 2.6 3.4 3.7 2.9 3.4	27.1	1.0	5-5+5-3+ 4o4o3o4-	33-	1
5	3.0 3.2 2.5 2.9 1.7 1.8 3.1 3.3	21.5	0.8	3+4+3o3+ 2-2o3+3+	24+	10 18
6	2.1 2.1 2.3 2.1 2.8 3.1 5.1 3.3	22.9	1.1	2+3+4-3- 3+3+5+3+	27+	19
7	4.4 3.5 2.7 2.9 2.9 3.2 2.6 2.7	24.9	1.0	5o5-4-4- 3-3+3-3-	28+	27
8	3.3 1.7 1.3 1.1 1.4 0.8 2.7 2.0	14.3	0.4	4-2+1+2- 2-1-3-2o	16o	
9	1.3 2.7 3.1 3.0 3.1 3.6 2.8 2.3	21.9	0.8	2-4-4o4- 3+4o3-2+	25+	
10	2.1 1.7 0.8 0.7 0.9 1.1 1.1 0.4	8.8	0.0	2+2-1-1- 1-1-1o0o	8-	
11	0.3 0.3 0.7 0.9 2.4 1.8 2.9 3.2	12.5	0.4	0o0o1-1o 3-2-3o3+	12+	Five
12	4.2 2.8 3.4 3.1 3.4 4.3 1.8 2.5	25.5	1.1	6-4o5-3+ 4-5-2o2o	30o	Dist.
13	2.3 2.6 3.5 4.1 4.0 5.1 5.0 4.7	31.3	1.6	3-3+5-5+ 4+5o6o5+	37-	
14	4.7 3.3 3.9 2.8 3.9 4.2 5.3 4.3	32.4	1.6	6-4+5+3+ 4+4+6o5+	39-	3
15	3.5 3.5 3.0 3.4 3.5 3.9 3.1 3.0	26.9	1.1	4o5o4+4+ 4o4+3o3+	32+	13 14
16	2.7 2.4 1.9 2.5 2.6 3.0 2.3 1.5	18.9	0.6	3+3o2+3o 3-3+2+1+	21+	15
17	1.5 2.0 2.3 2.3 2.1 2.8 5.6 4.2	22.8	1.1	1+3o3-3- 3-3-6-5-	25+	29
18	2.8 1.6 1.7 2.3 1.5 0.9 2.1 2.0	14.9	0.4	3o2+2o3- 1+1o2o2-	16o	
19	1.2 2.1 1.2 0.9 1.5 2.0 2.4 2.9	14.2	0.4	1o3-1+1- 1+2o2o3o	14o	
20	2.5 2.0 1.1 1.1 1.9 3.2 4.0 4.0	19.8	0.9	3o2+1o1o 1+3+4-4o	20-	Ten Quiet
21	2.3 2.3 1.5 1.5 1.5 0.9 3.0 3.1	16.1	0.5	3-3o2-1+ 1o1o3o3+	17o	
22	3.4 1.7 1.6 2.1 2.3 2.5 3.7 3.6	20.9	0.9	4o2-2o2+ 2+3-4-4o	23-	1
23	3.2 2.3 1.5 2.3 3.0 3.9 4.2 3.4	23.8	0.9	4-3o2o3- 3o4-4o4o	26o	8
24	2.8 2.4 1.6 1.5 3.5 4.1 2.3 1.9	20.1	0.9	3+3o2o2- 3+4+3-2o	22+	10
25	2.6 1.8 2.4 2.5 2.9 3.6 2.8 4.3	22.9	1.0	3o2o3+3o 3o4-3-5-	25+	11 16
26	2.1 1.7 1.4 1.5 3.6 2.5 3.7 2.0	18.5	0.7	3-2o2-2- 4o2o4-2o	20-	18
27	2.0 1.5 1.3 1.7 1.3 1.3 1.6 2.5	13.2	0.1	2+2o2-2- 1+2-2-3-	15o	19
28	2.2 1.8 2.1 2.3 3.7 3.4 3.7 4.1	23.3	1.0	3o2+3o2+ 4-3+4-5-	26o	21
29	3.1 2.7 2.4 3.4 3.9 4.0 3.5 3.3	26.3	1.1	4o4-3+4+ 4o4o4-4-	31-	26
30	3.1 1.6 2.8 1.9 3.4 2.6 2.7 1.9	20.0	0.7	4o2-4-2+ 4-3-2+2-	22o	27
Mean	2.65 2.28 2.13 2.23 2.68 2.80 3.13 3.02	2.62	0.81			

Table 83

Sudden Ionosphere Disturbances Observed at Washington, D. C.

December 1951

No sudden ionosphere disturbances were observed during the month of December.

Table 84

Sudden Ionosphere Disturbances Reported by Institut für Ionosphärenforschung, as Observed at Lindau, Harz, Germany

1951 Day	GCT Beginning	GCT End	Location of transmitters	Relative intensity at minimum*	Other phenomena
November 6	0944	1000	München**, Lindau***, Wiesbaden#	0.07	

*Ratio of received field intensity during SID to average field intensity before and after, for station München, 6160 kilocycles, 400 kilometers distant.
**Station München, 6160 kilocycles.
***Station Lindau, 1850 kilocycles, pulse, transmitter and receiver at Lindau.
#Station Wiesbaden, 2985 kilocycles.

Note: Observers are invited to send to the CRPL information on times of beginning and end of sudden ionosphere disturbances for publication as above. Address letters to the Central Radio Propagation Laboratory, National Bureau of Standards, Washington 25, D. C.

GRAPHS OF IONOSPHERIC DATA

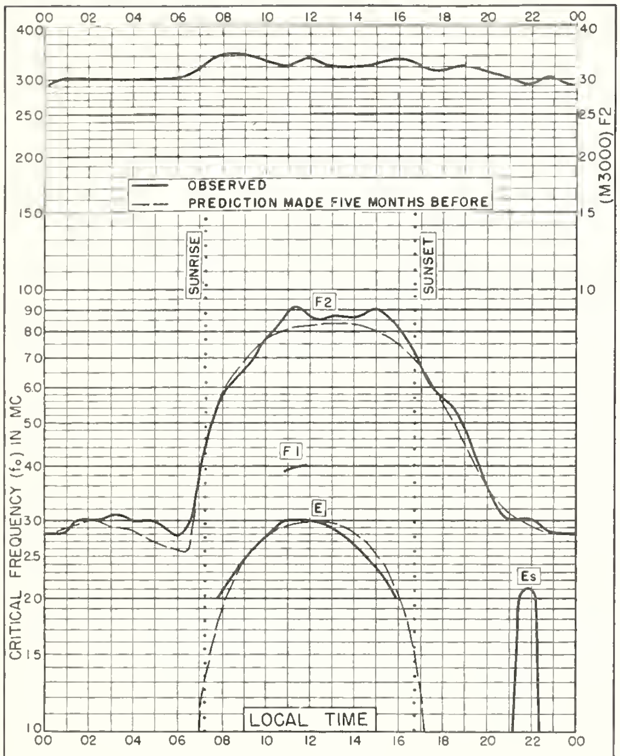

Fig 1. WASHINGTON, D. C.
38.7° N, 77.1° W DECEMBER 1951

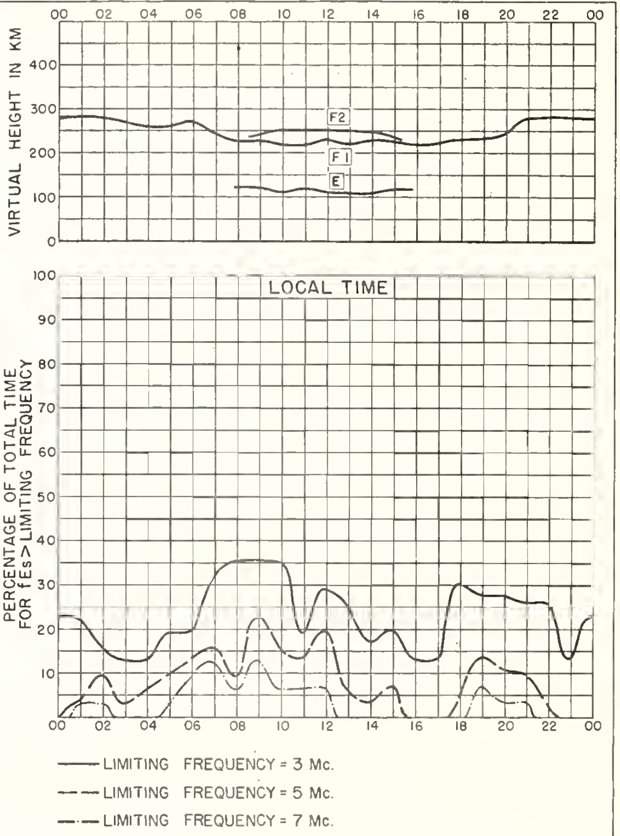

Fig. 2. WASHINGTON, D. C. DECEMBER 1951

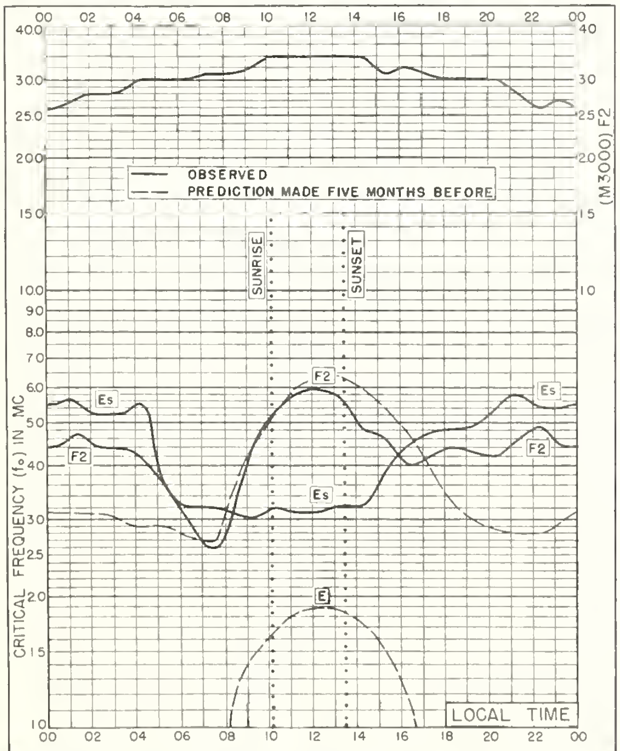

Fig 3. TROMSO, NORWAY
69.7° N, 19.0°E NOVEMBER 1951

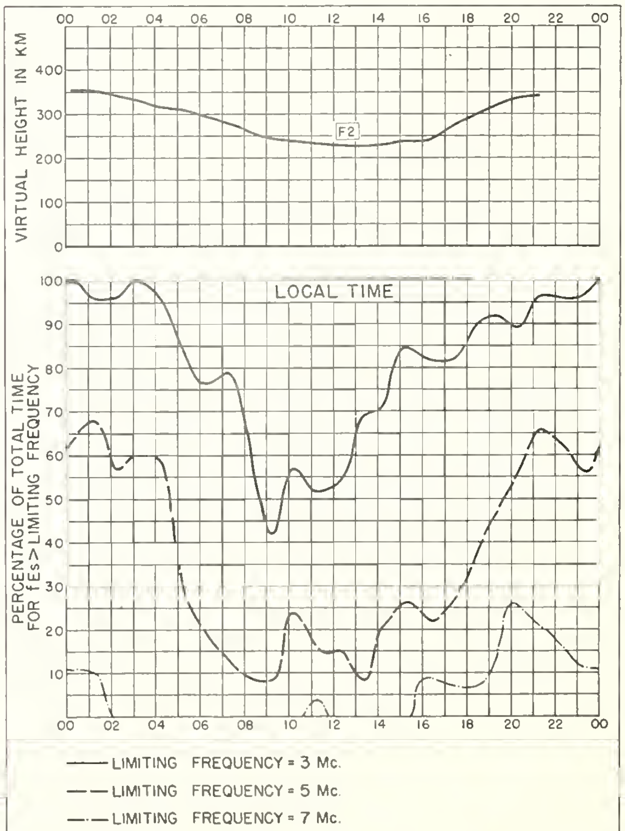

Fig.4 TROMSO, NORWAY NOVEMBER 1951

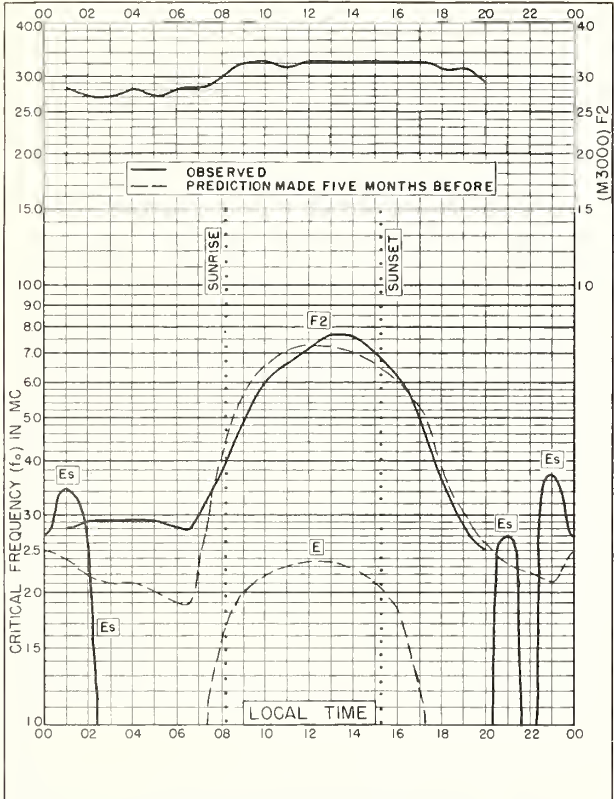

Fig. 5 ANCHORAGE, ALASKA
61.2° N, 149.9° W NOVEMBER 1951

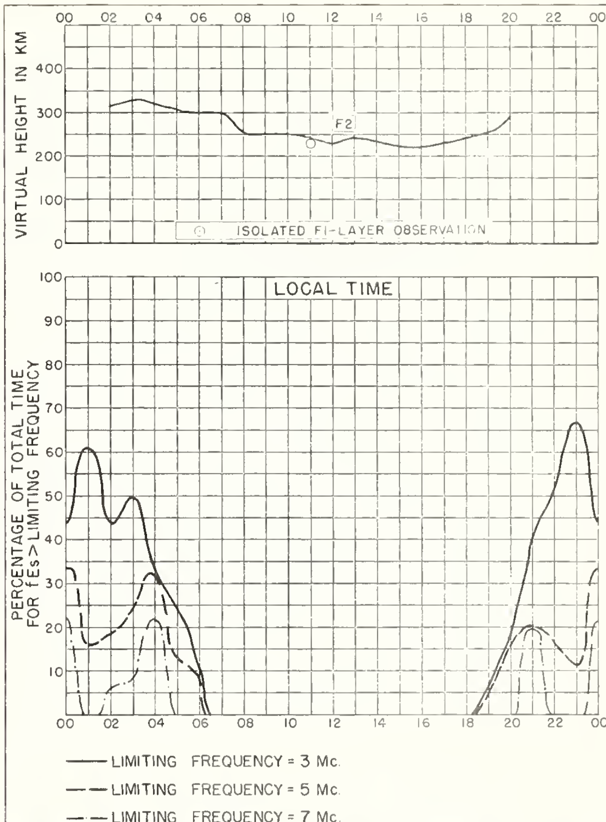

Fig. 6. ANCHORAGE, ALASKA NOVEMBER 1951

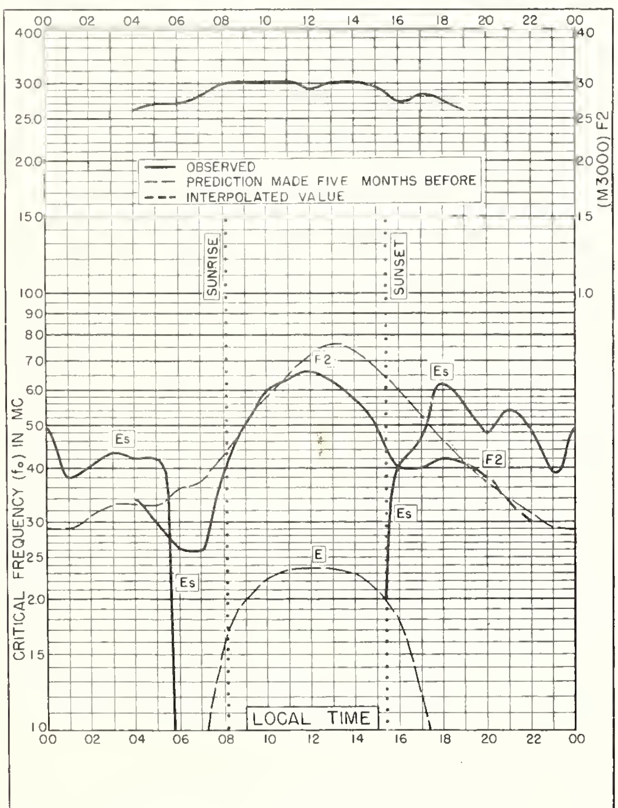

Fig. 7. NARSARSSUAK, GREENLAND
61.2°N, 45.4°W NOVEMBER 1951

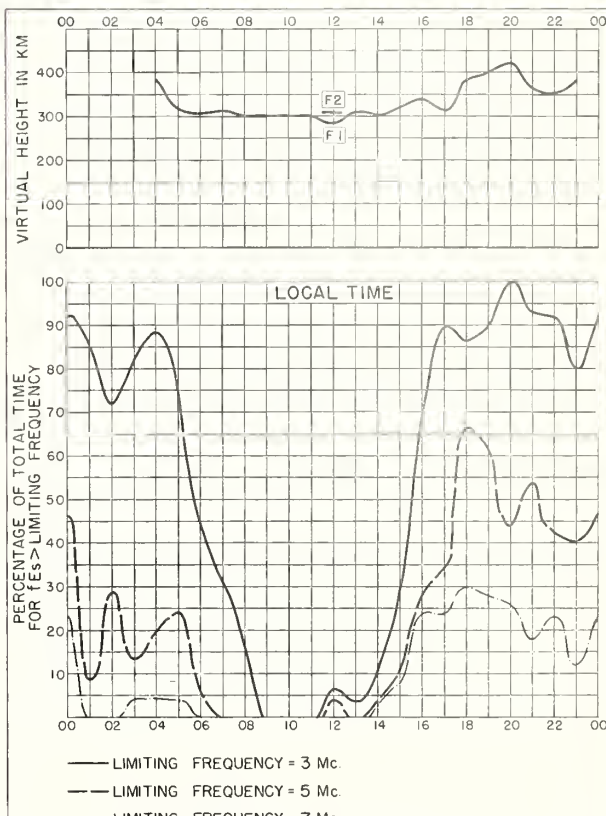

Fig 8. NARSARSSUAK, GREENLAND NOVEMBER 1951

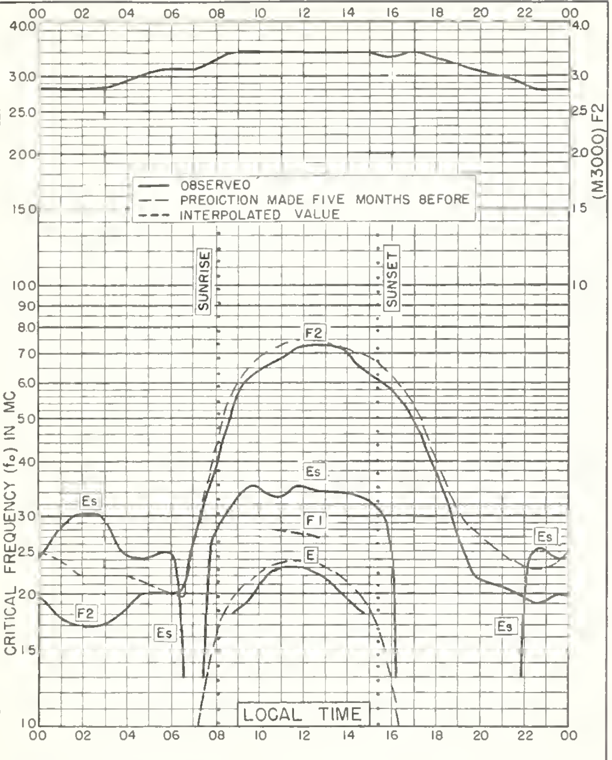

Fig. 9 OSLO, NORWAY
60.0°N, 11.0°E NOVEMBER 1951

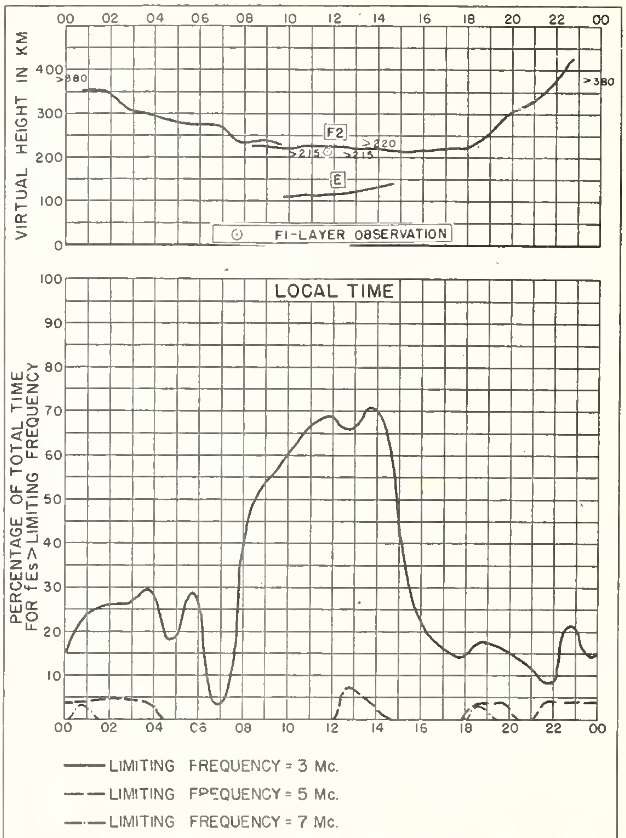

Fig. 10. OSLO, NORWAY NOVEMBER 1951

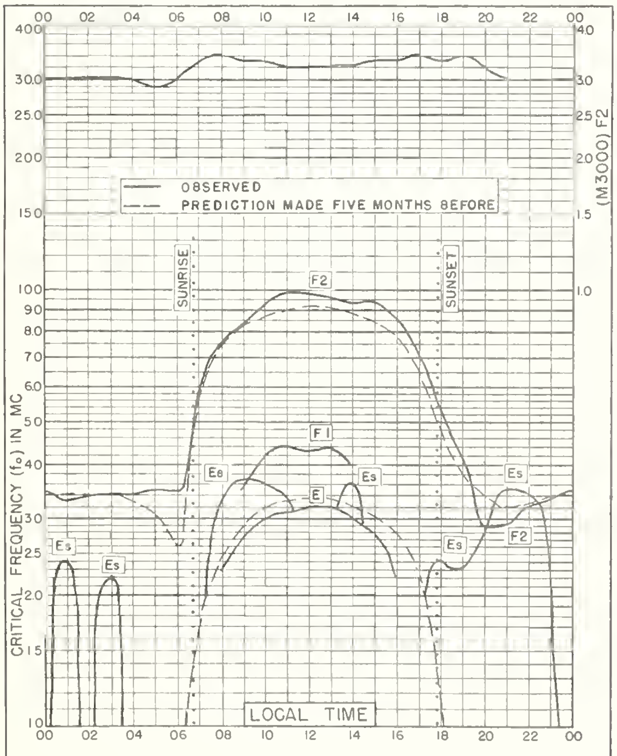

Fig. 11. SAN FRANCISCO, CALIFORNIA
37.4° N, 122 2° W NOVEMBER 1951

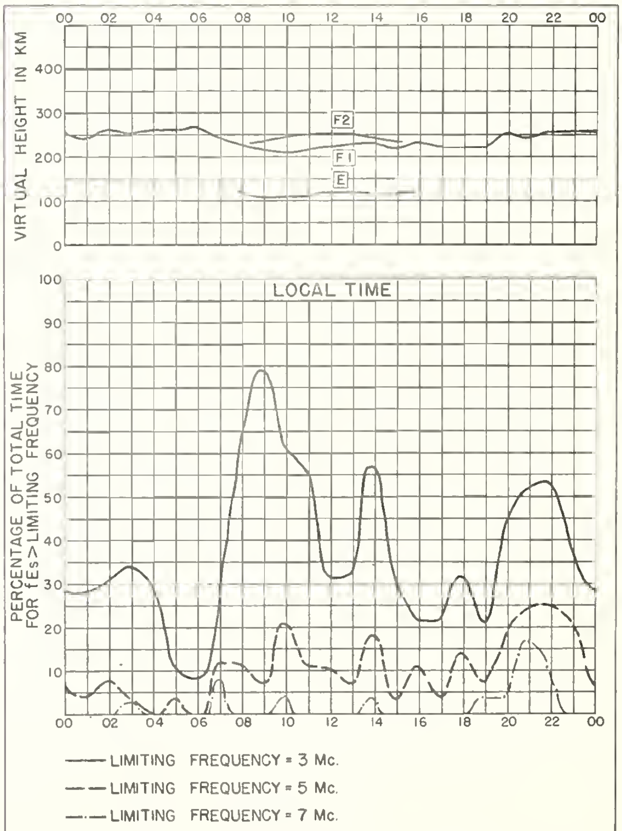

Fig. 12. SAN FRANCISCO, CALIFORNIA NOVEMBER 1951

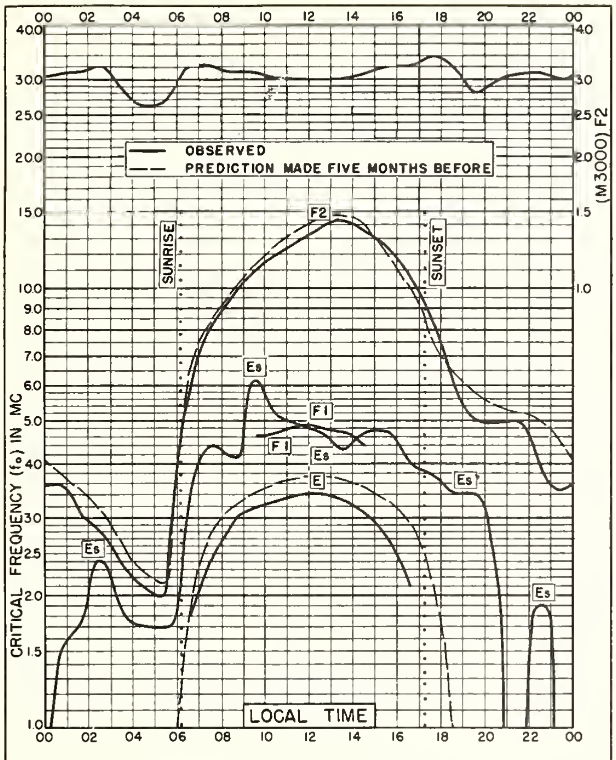

Fig. 13. MAUI, HAWAII
20.8°N, 156.5°W NOVEMBER 1951

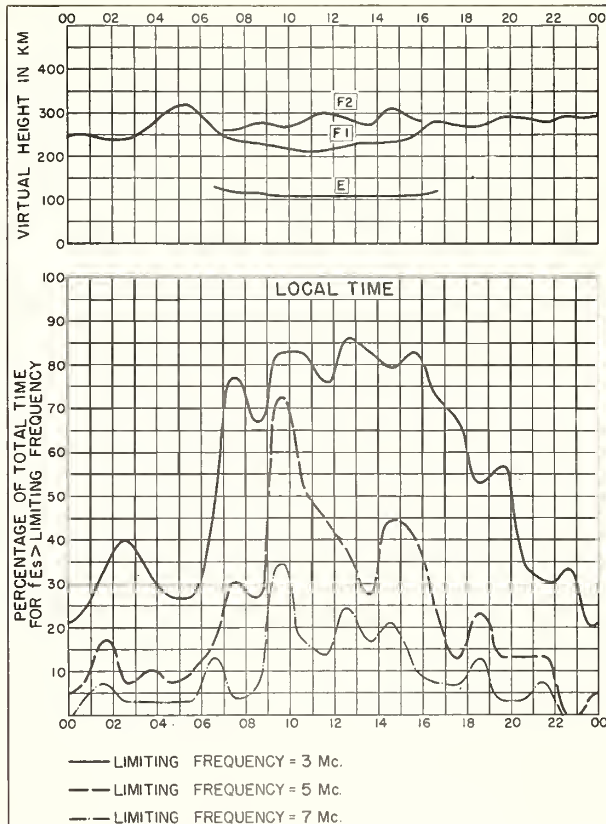

Fig 14. MAUI, HAWAII NOVEMBER 1951

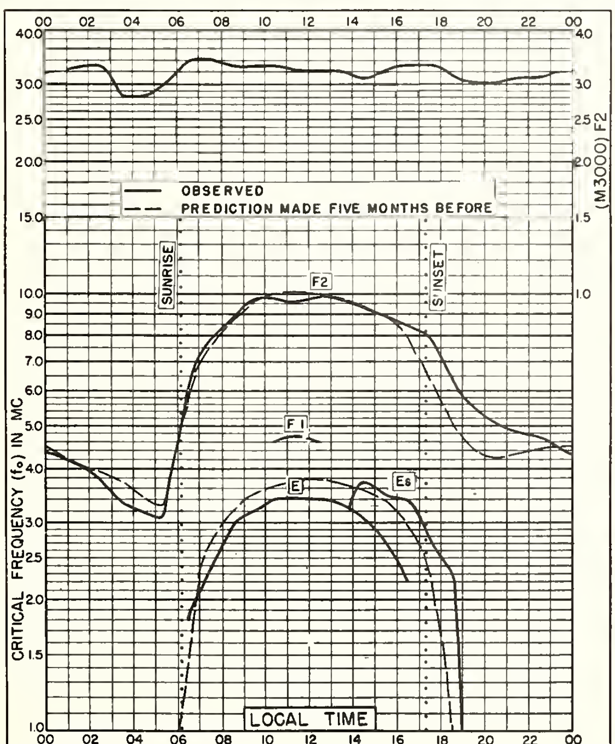

Fig. 15. PUERTO RICO, W. I.
18.5°N, 67.2°W NOVEMBER 1951

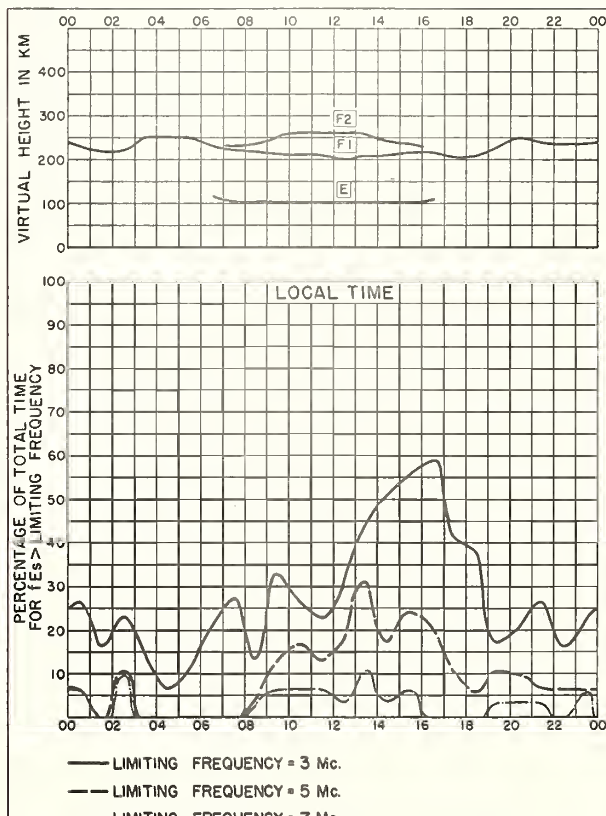

Fig. 16. PUERTO RICO, W. I. NOVEMBER 1951

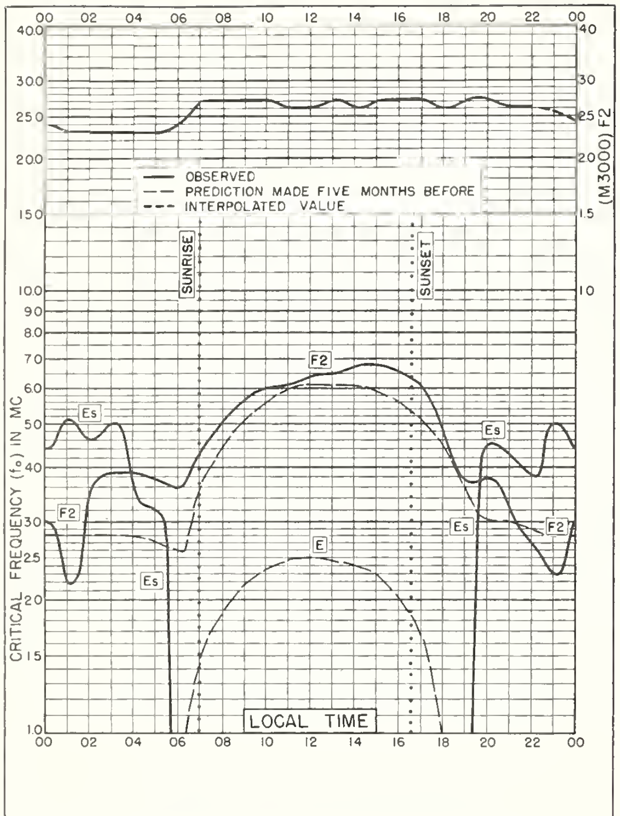

Fig. 17 FAIRBANKS, ALASKA
64.9°N, 147.8°W OCTOBER 1951

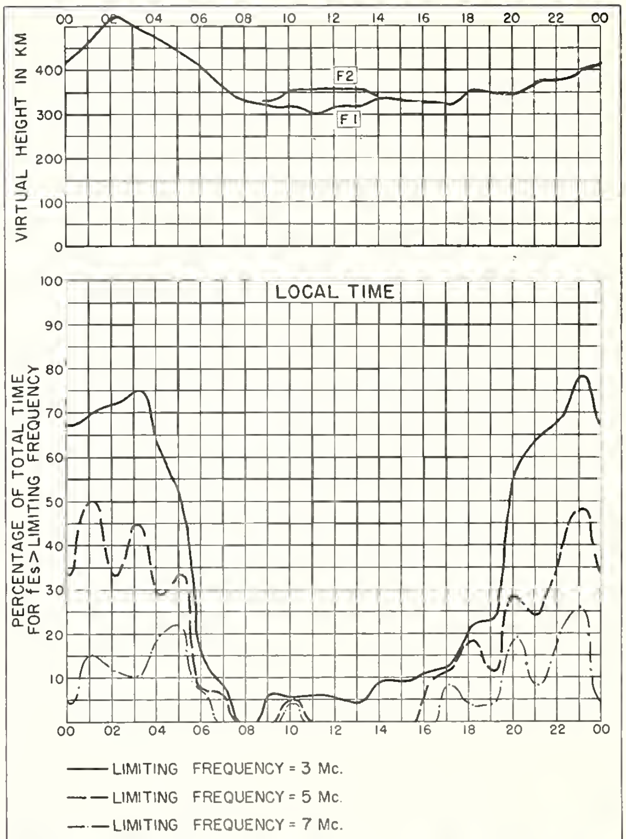

Fig. 18. FAIRBANKS, ALASKA OCTOBER 1951

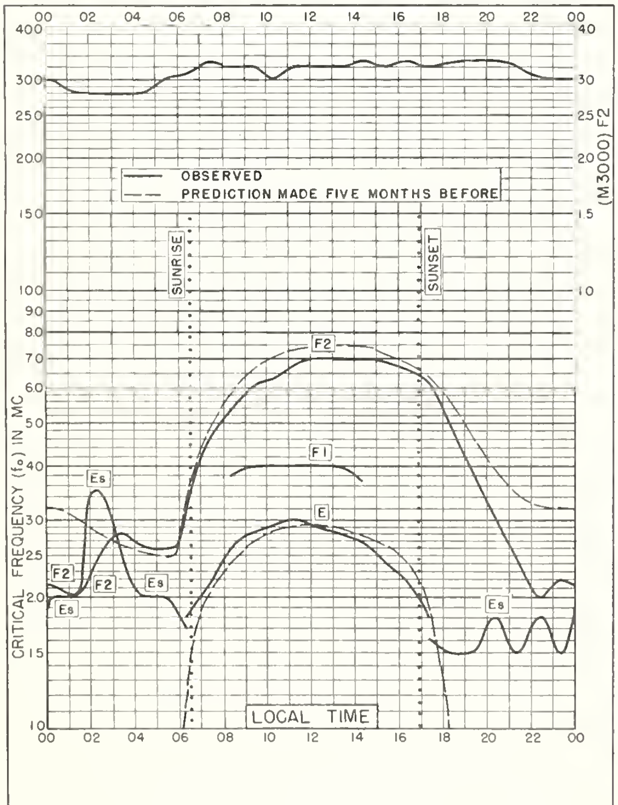

Fig. 19. PRINCE RUPERT, CANADA
54.3°N, 130.3°W OCTOBER 1951

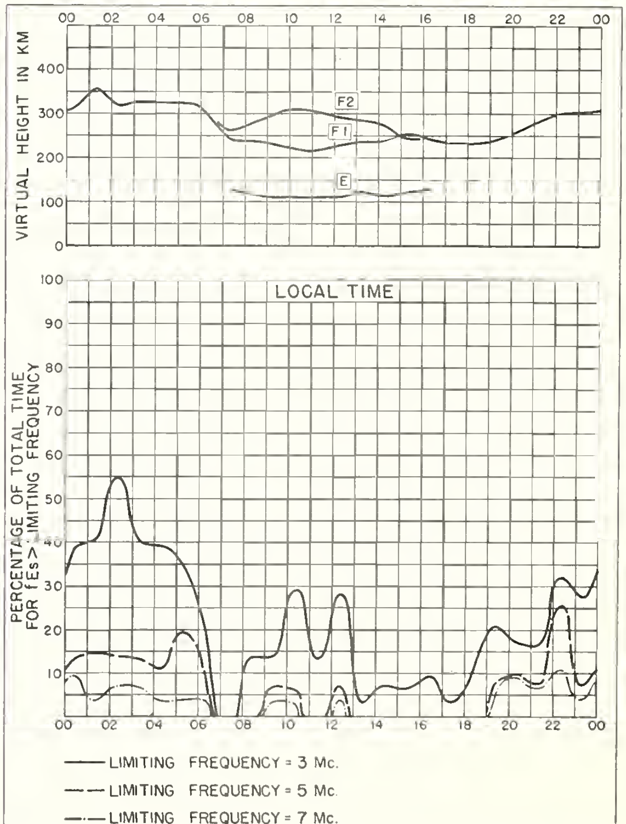

Fig. 20. PRINCE RUPERT, CANADA OCTOBER 1951

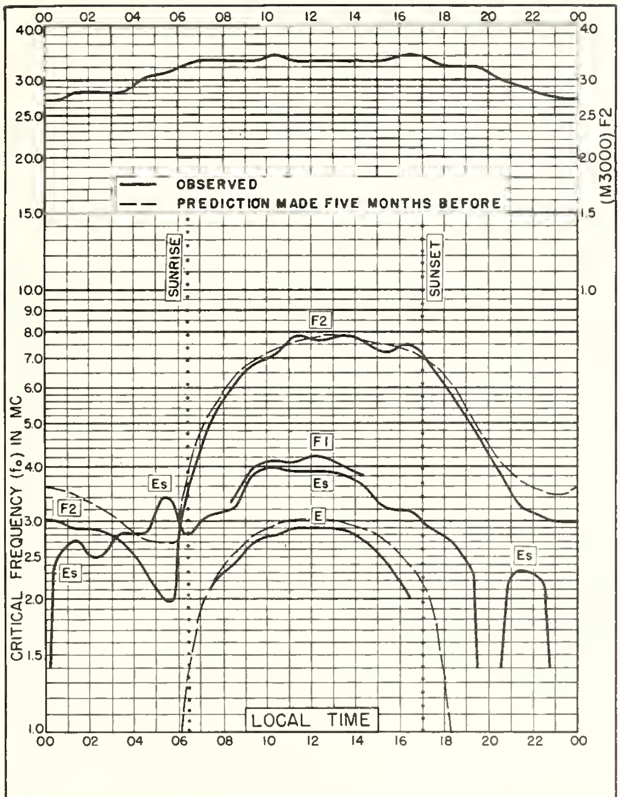

Fig. 21. De BILT, HOLLAND
52.1°N, 5.2°E OCTOBER 1951

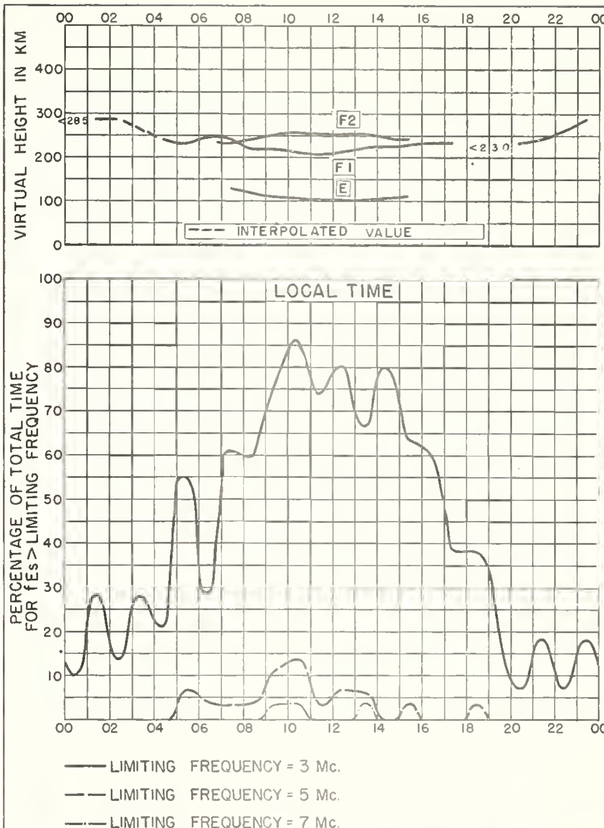

Fig. 22. De BILT, HOLLAND OCTOBER 1951

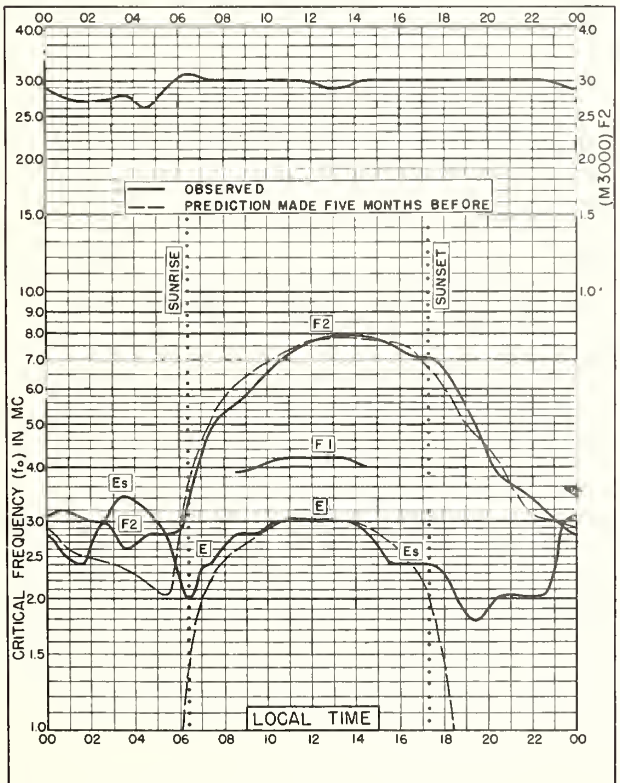

Fig. 23. WINNIPEG, CANADA
49.9°N, 97.4°W OCTOBER 1951

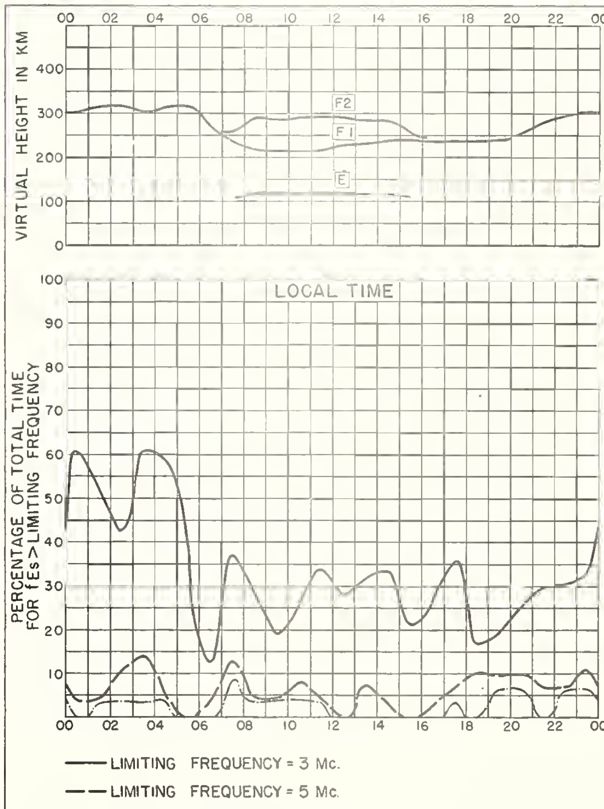

Fig. 24. WINNIPEG, CANADA OCTOBER 1951

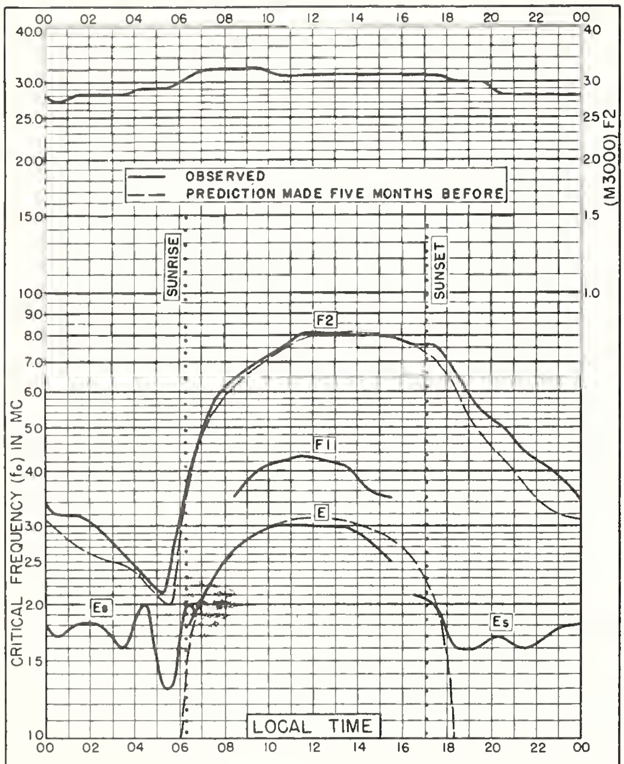

Fig. 25. ST JOHN'S, NEWFOUNDLAND
47.6°N, 52.7°W OCTOBER 1951

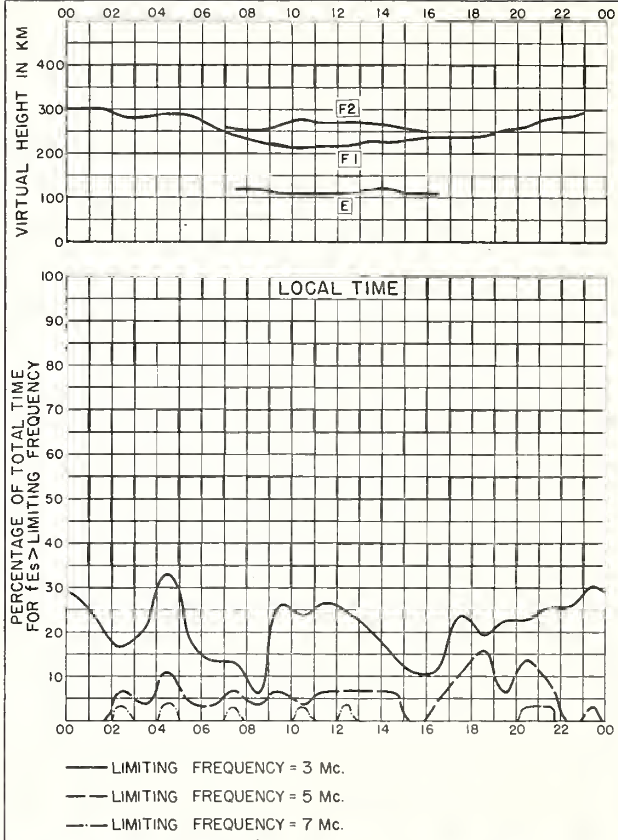

Fig. 26. ST JOHN'S, NEWFOUNDLAND OCTOBER 1951

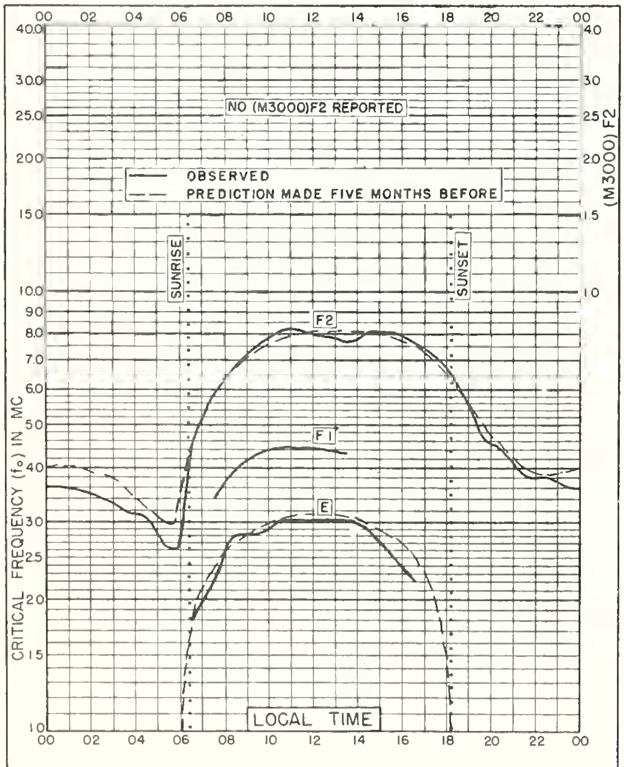

Fig. 27. SCHWARZENBURG, SWITZERLAND
46.8°N, 7.3°E OCTOBER 1951

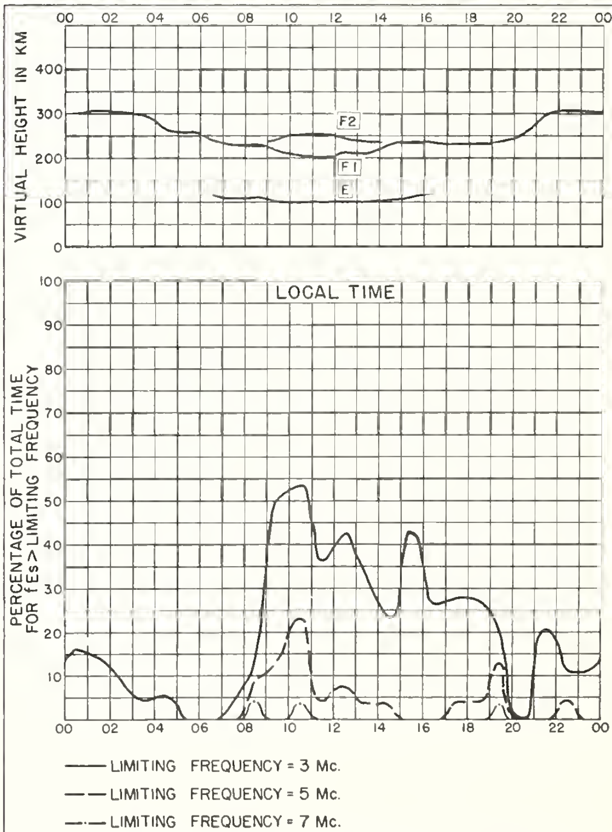

Fig. 28. SCHWARZENBURG, SWITZERLAND OCTOBER 1951

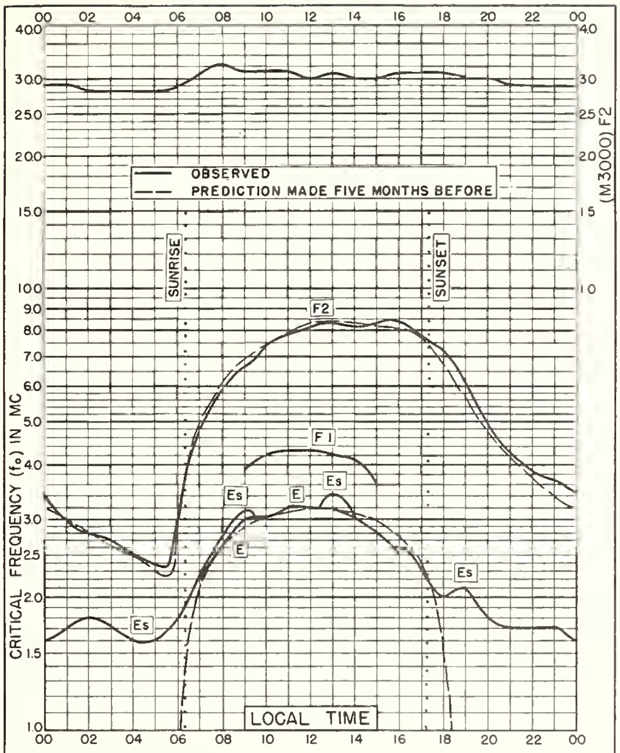

Fig. 29. OTTAWA, CANADA
45.4°N, 75.7°W OCTOBER 1951

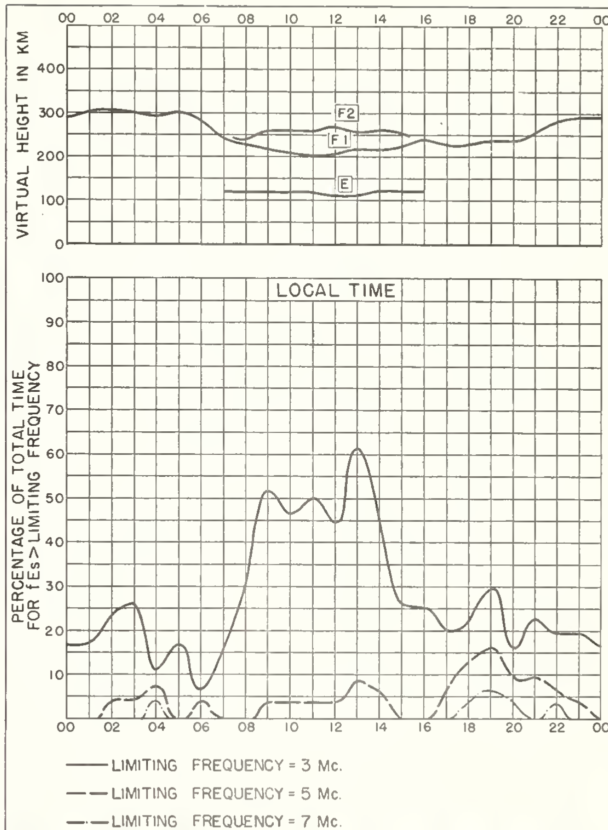

Fig. 30. OTTAWA, CANADA OCTOBER 1951

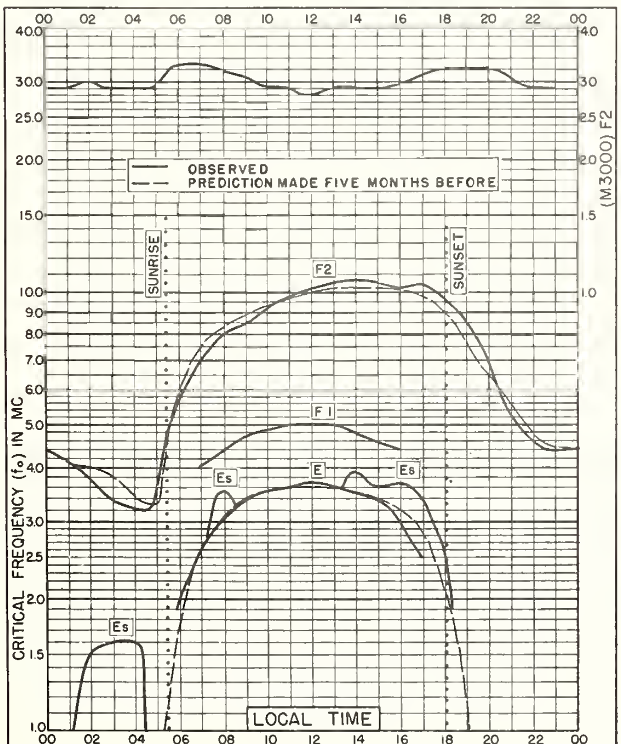

Fig. 31. JOHANNESBURG, U. OF S. AFRICA
26.2°S, 28.1°E OCTOBER 1951

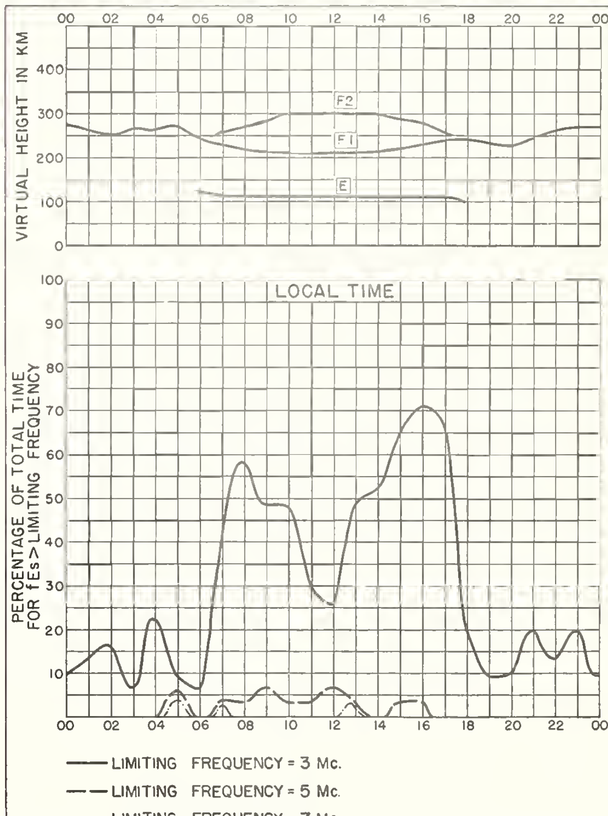

Fig. 32. JOHANNESBURG, U. OF S. AFRICA OCTOBER 1951

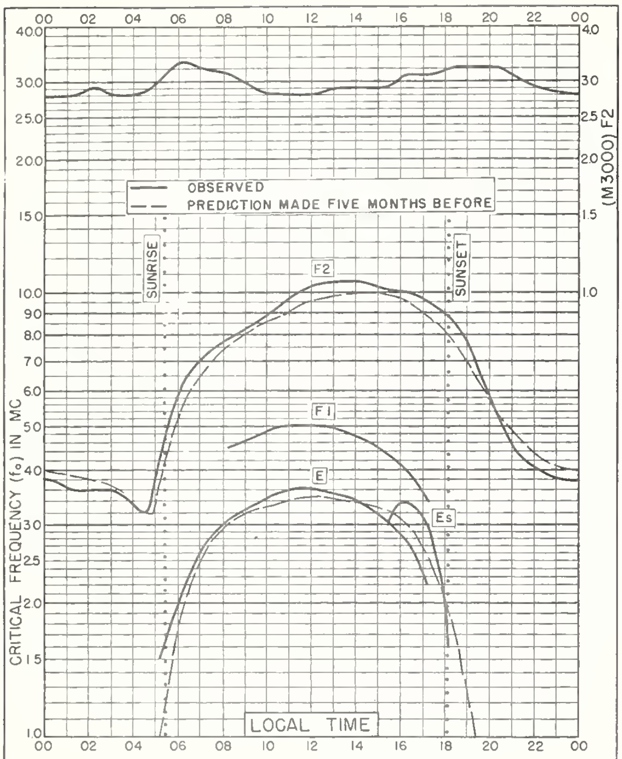

Fig. 33. CAPETOWN, U. OF S. AFRICA
34.2°S, 18.3°E OCTOBER 1951

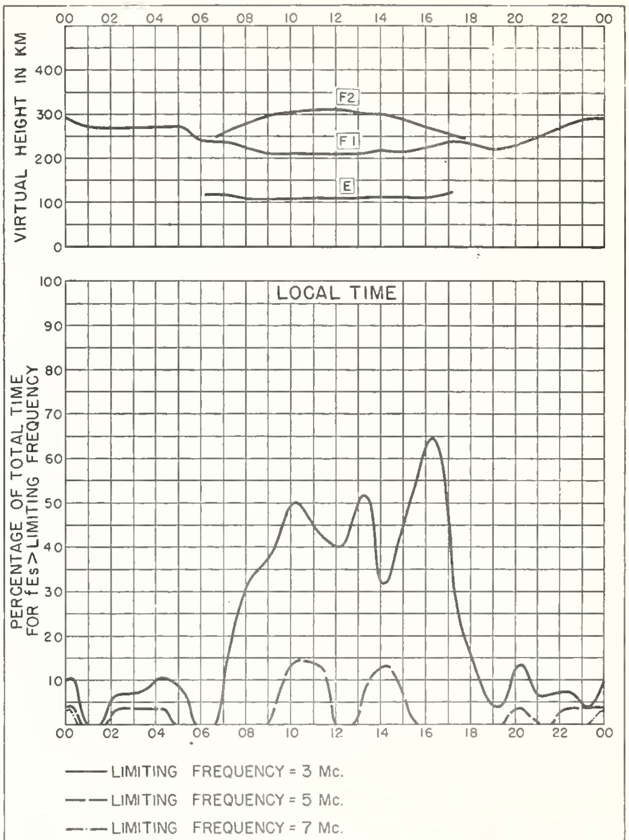

Fig. 34. CAPETOWN, U. OF S. AFRICA OCTOBER 1951

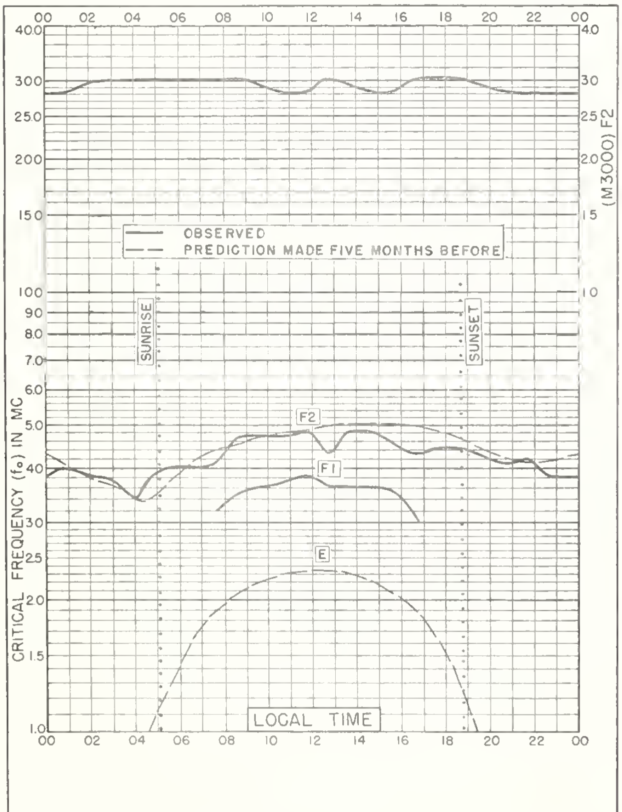

Fig. 35. RESOLUTE BAY, CANADA
74.7°N, 94.9°W SEPTEMBER 1951

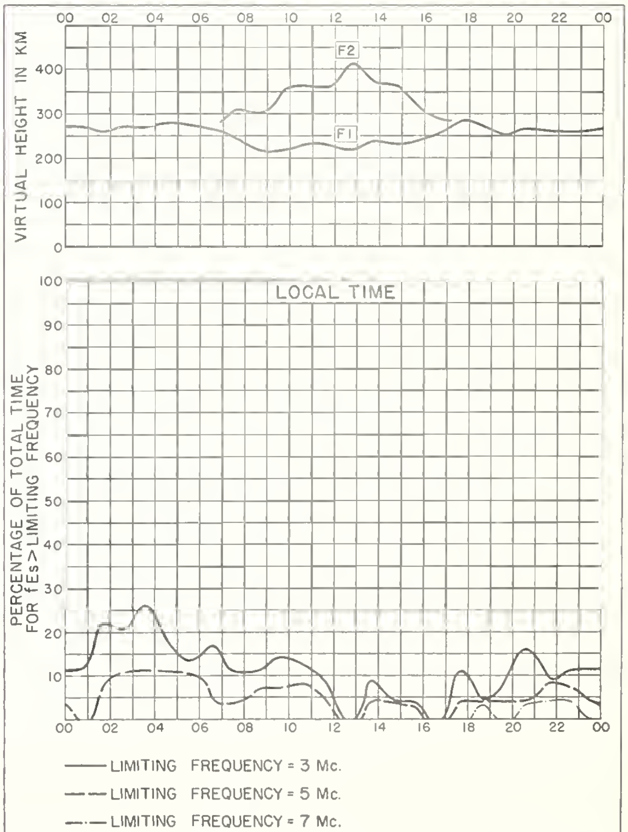

Fig. 36. RESOLUTE BAY, CANADA SEPTEMBER 1951

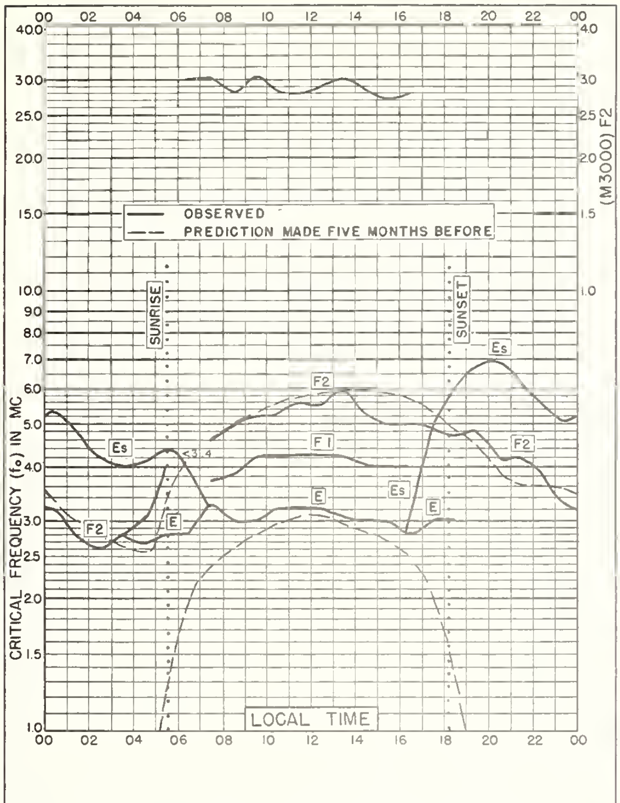

Fig. 37. FORT CHIMO, CANADA
58.1° N, 68.3° W SEPTEMBER 1951

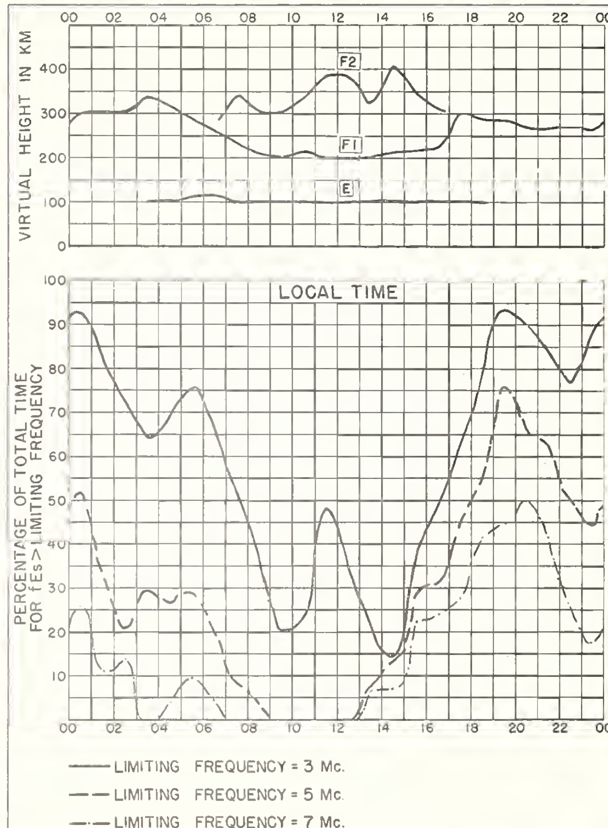

Fig. 38. FORT CHIMO, CANADA SEPTEMBER 1951

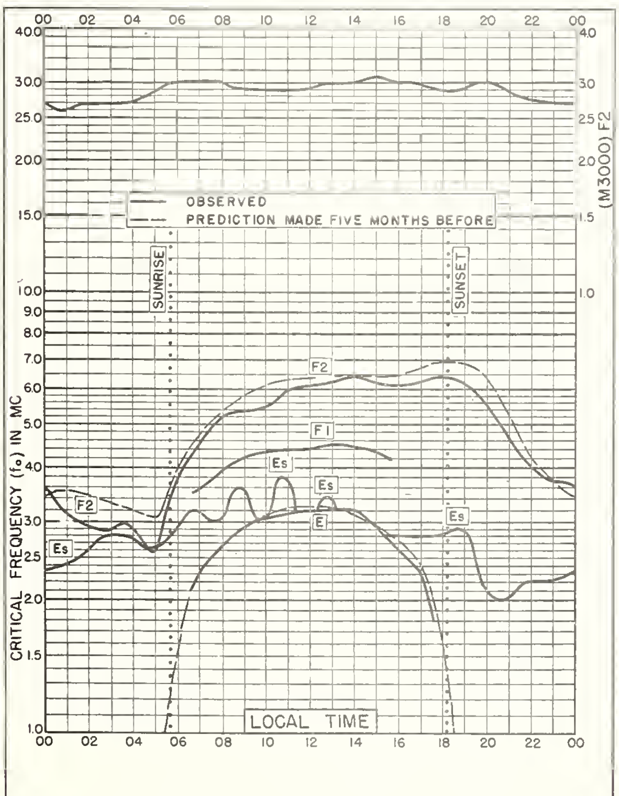

Fig. 39. LINDAU/HARZ, GERMANY
51.6°N, 10.1°E SEPTEMBER 1951

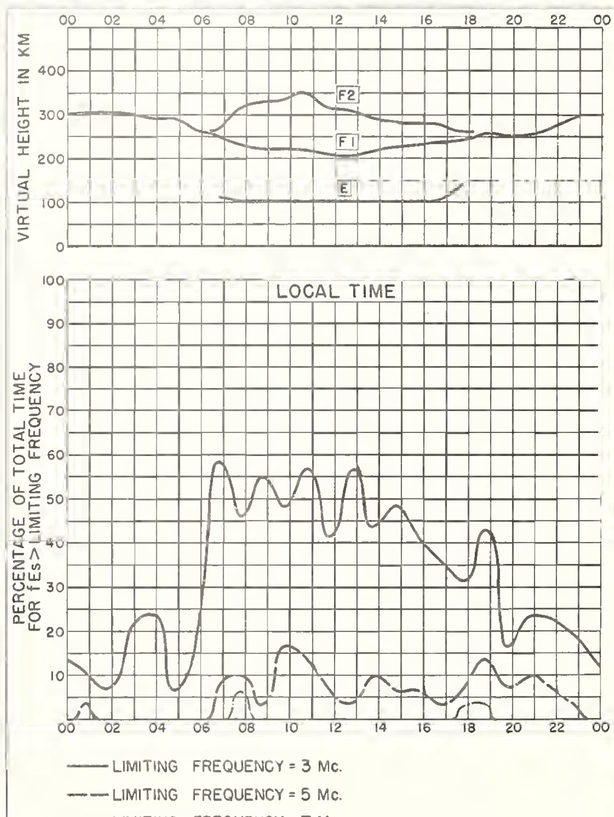

Fig. 40. LINDAU / HARZ, GERMANY SEPTEMBER 1951

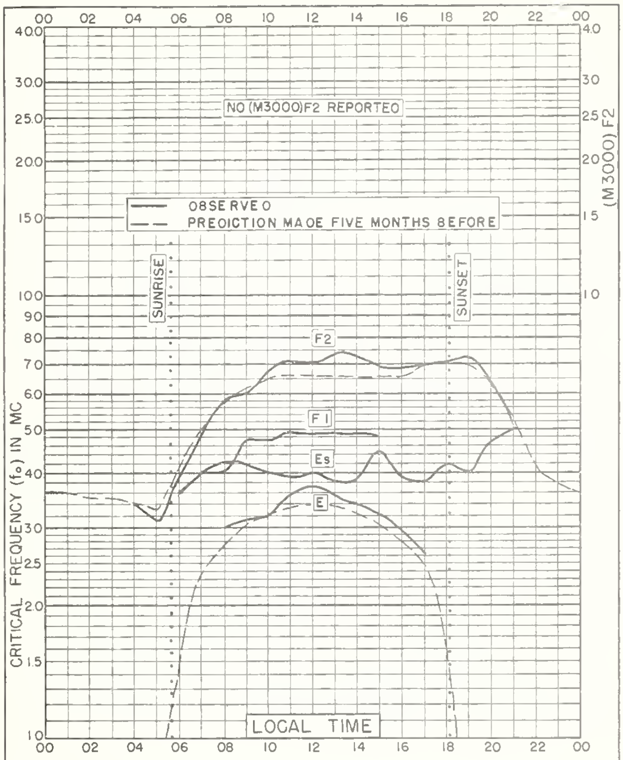

Fig. 41. GRAZ, AUSTRIA
47.1° N, 15.5° E SEPTEMBER 1951

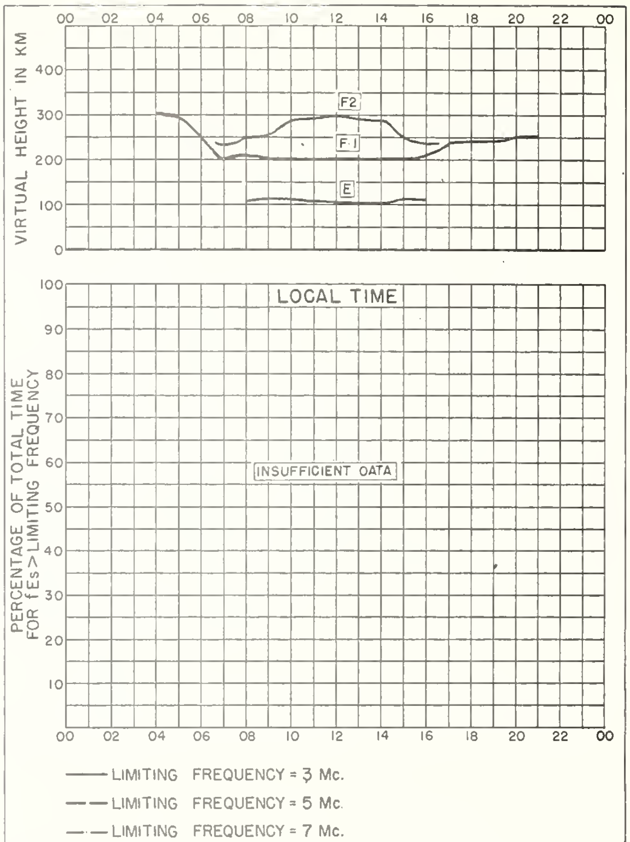

Fig. 42. GRAZ, AUSTRIA SEPTEMBER 1951

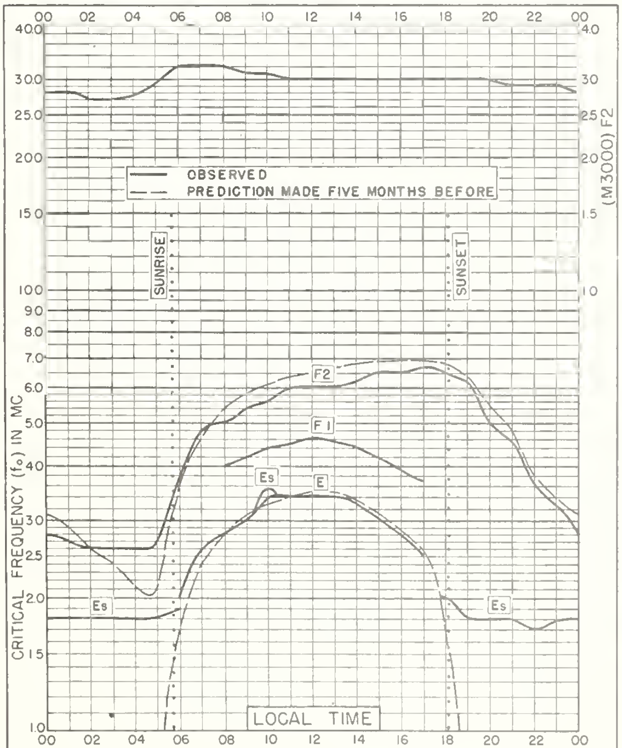

Fig. 43. OTTAWA, CANADA
45.4° N, 75.7° W SEPTEMBER 1951

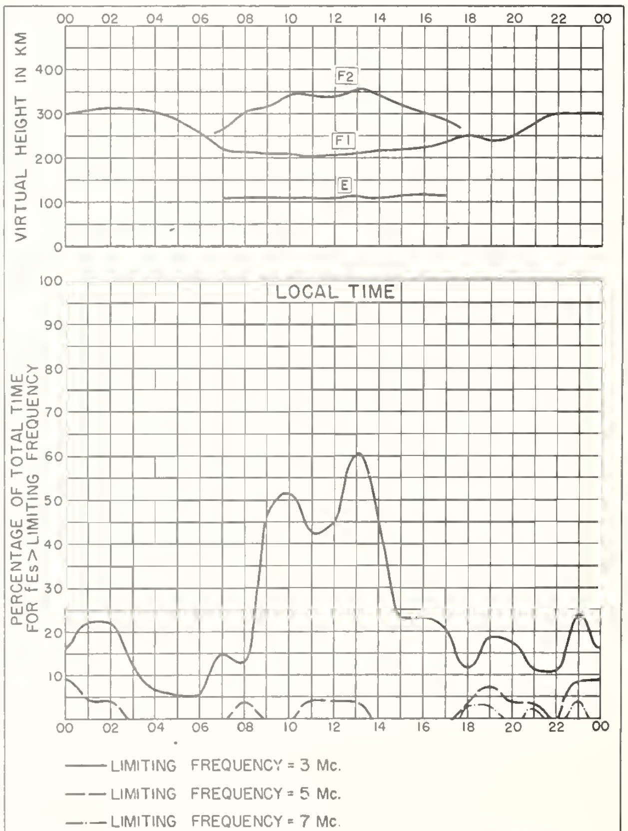

Fig. 44. OTTAWA, CANADA SEPTEMBER 1951

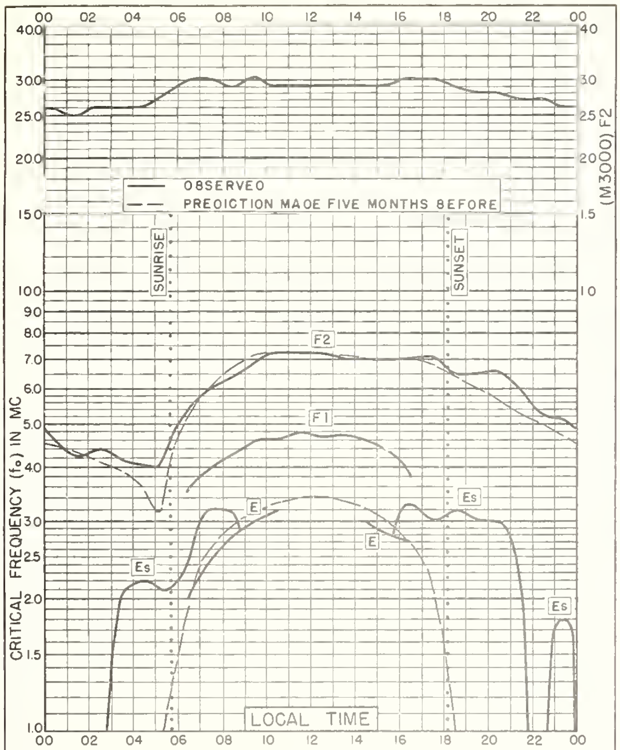

Fig. 45. WAKKANAI, JAPAN
45.4°N, 141.7°E SEPTEMBER 1951

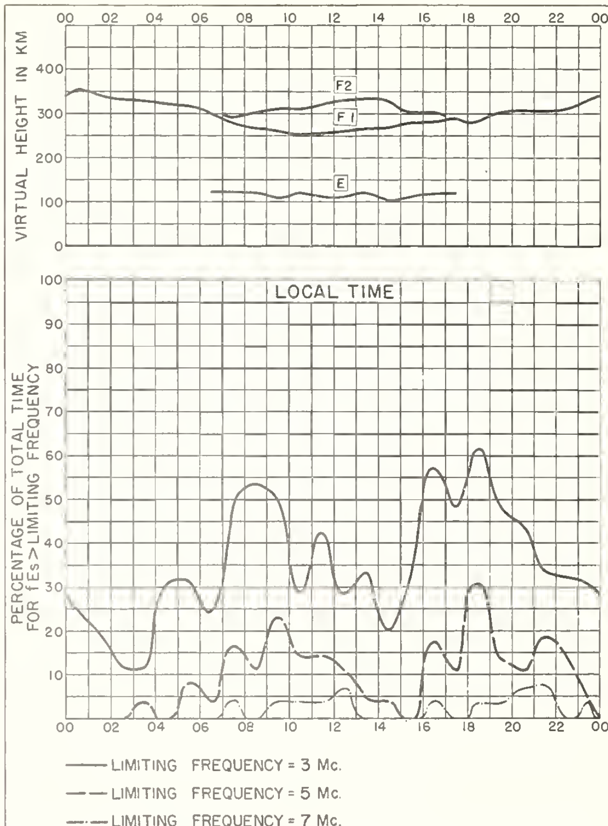

Fig. 46. WAKKANAI, JAPAN SEPTEMBER 1951

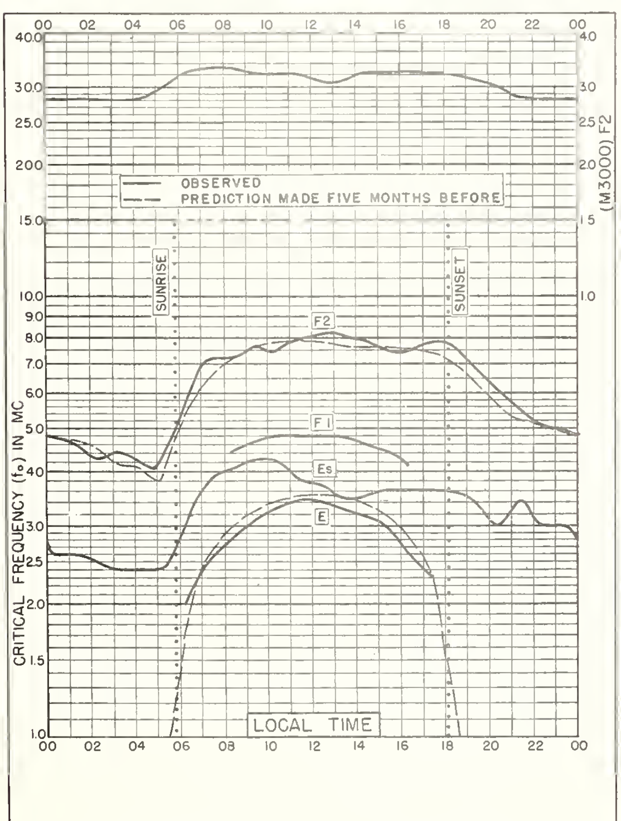

Fig. 47. AKITA, JAPAN
39.7°N, 140.1°E SEPTEMBER 1951

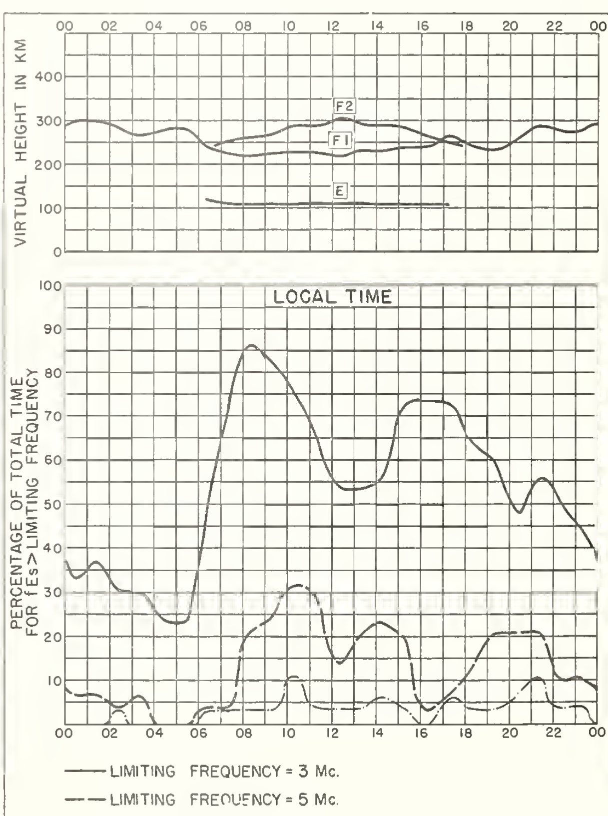

Fig. 48. AKITA, JAPAN SEPTEMBER 1951

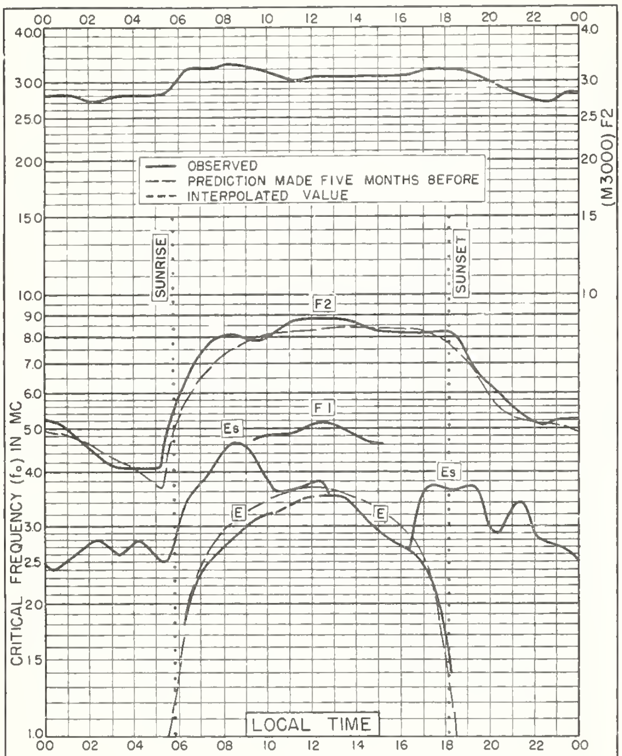

Fig. 49. TOKYO, JAPAN
35.7°N, 139.5°E SEPTEMBER 1951

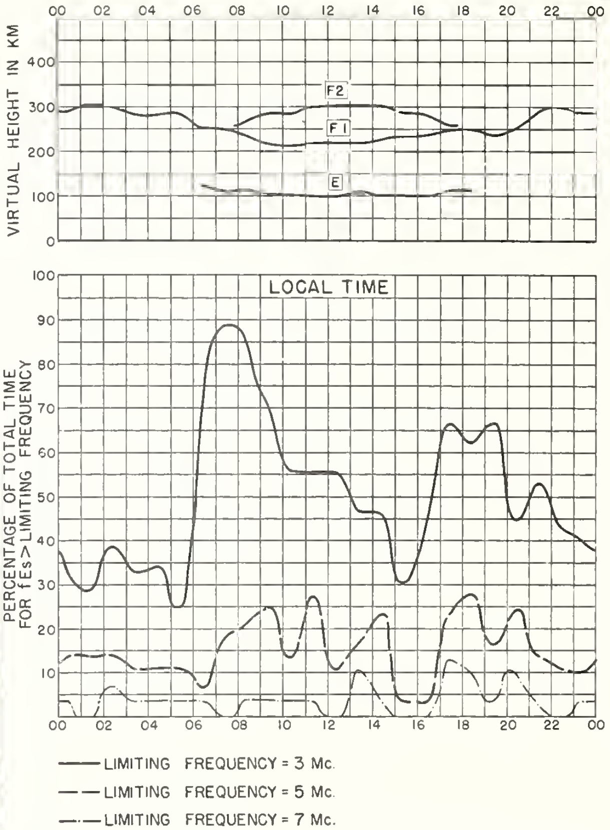

Fig 50. TOKYO, JAPAN SEPTEMBER 1951

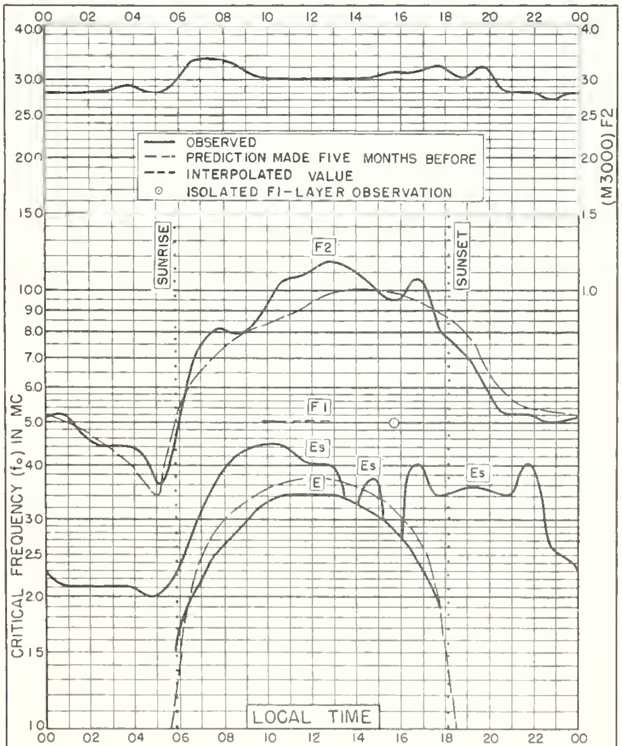

Fig. 51. YAMAGAWA, JAPAN
31.2° N, 130.6°E SEPTEMBER 1951

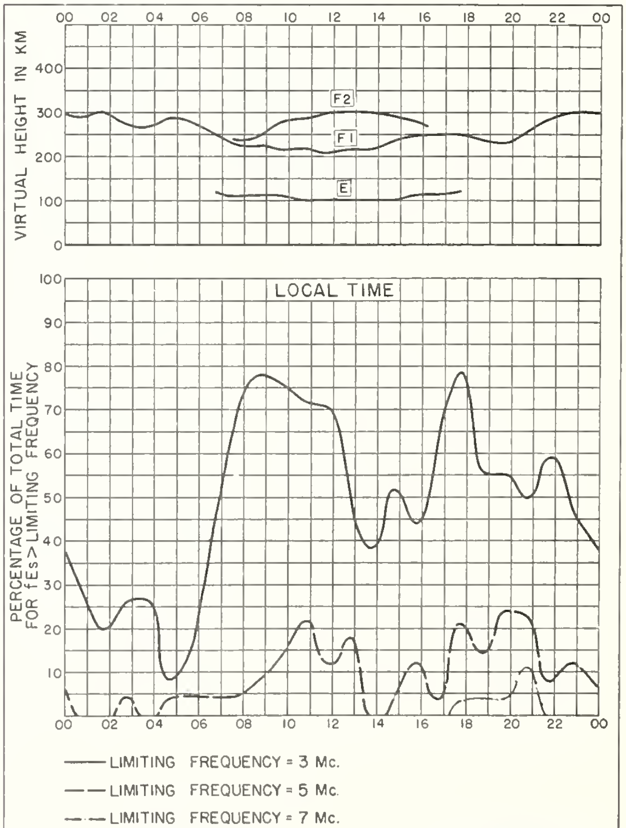

Fig. 52. YAMAGAWA, JAPAN SEPTEMBER 1951

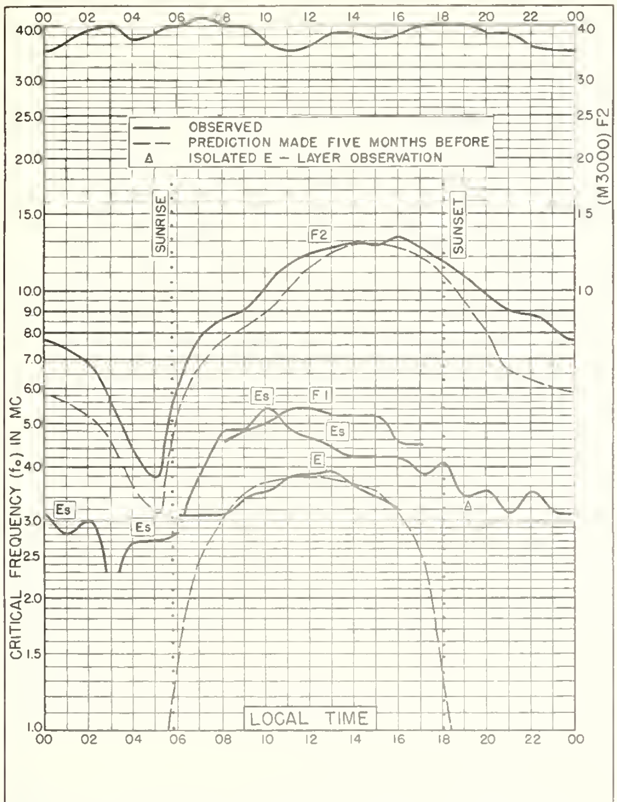

Fig. 53. FORMOSA, CHINA
25.0° N, 121.5°E SEPTEMBER 1951

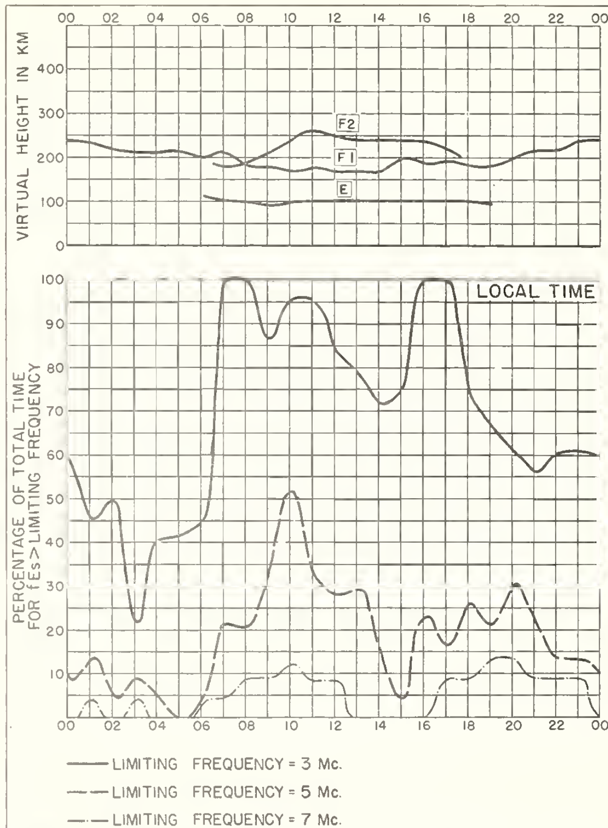

Fig. 54. FORMOSA, CHINA SEPTEMBER 1951

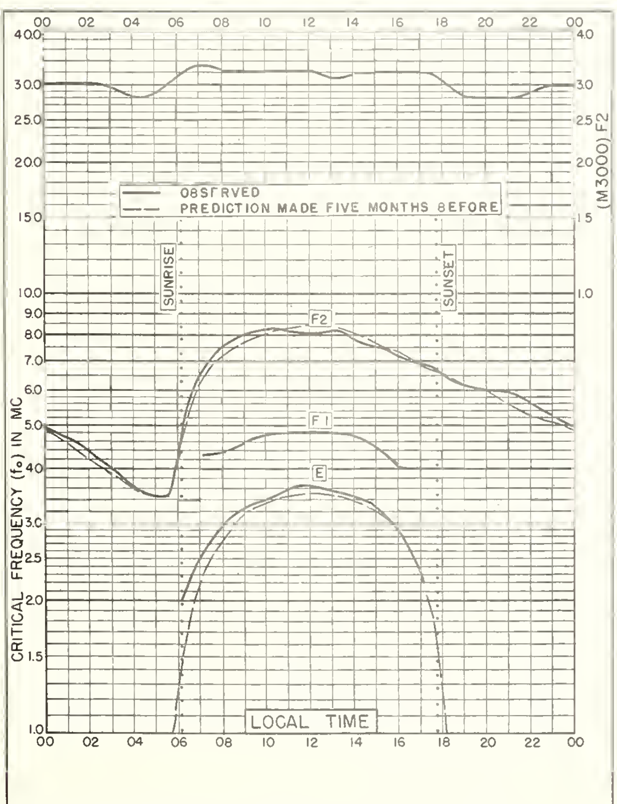

Fig. 55. BRISBANE, AUSTRALIA
27.5° S, 153.0°E SEPTEMBER 1951

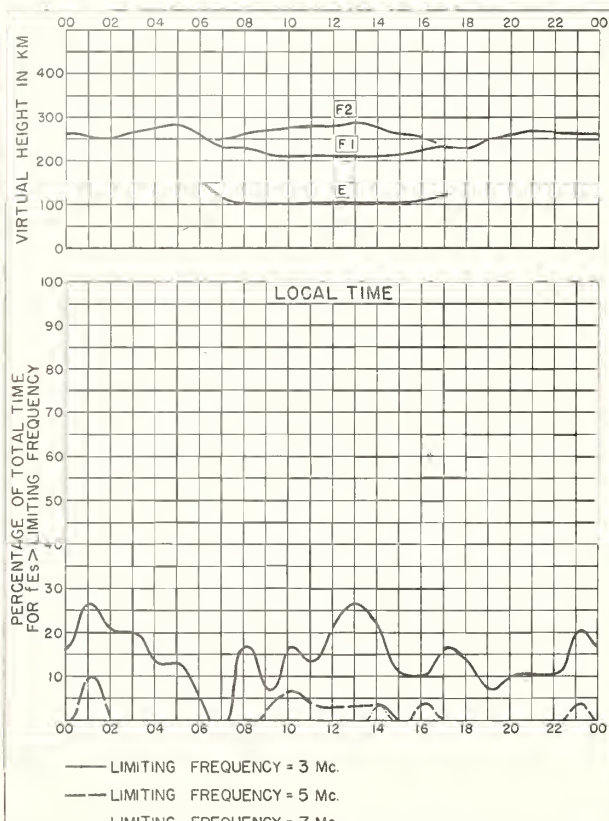

Fig. 56. BRISBANE, AUSTRALIA SEPTEMBER 1951

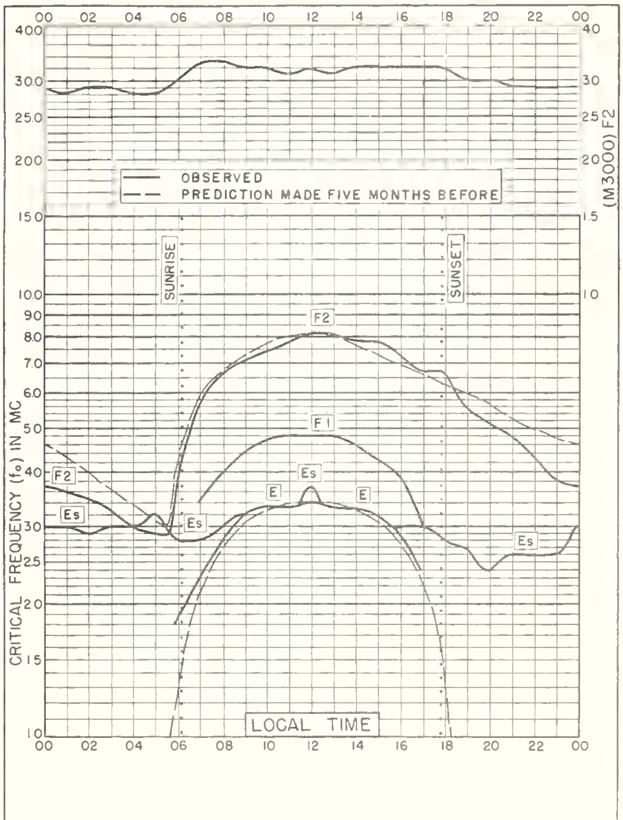

Fig. 57. WATHEROO, W. AUSTRALIA
30.3° S, 115.9°E SEPTEMBER 1951

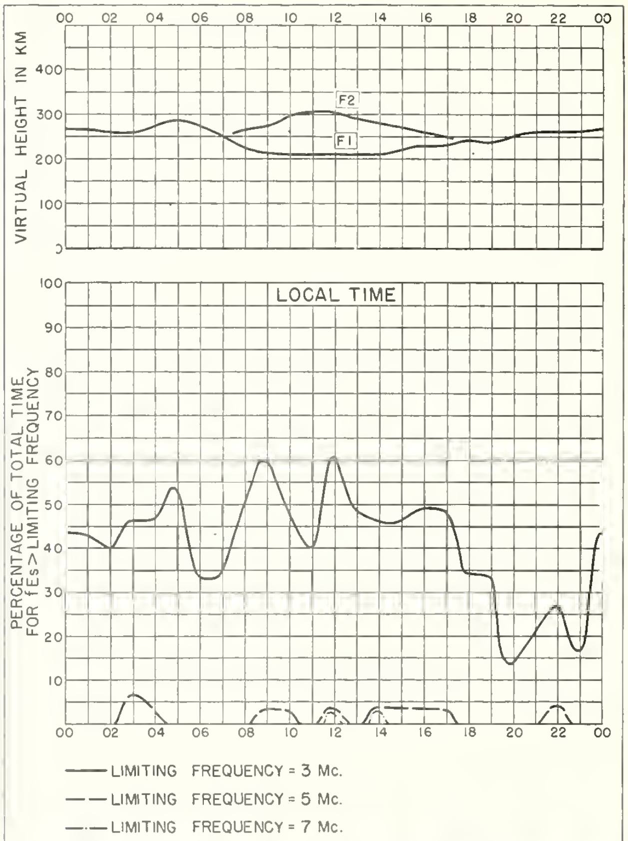

Fig. 58. WATHEROO, W. AUSTRALIA SEPTEMBER 1951

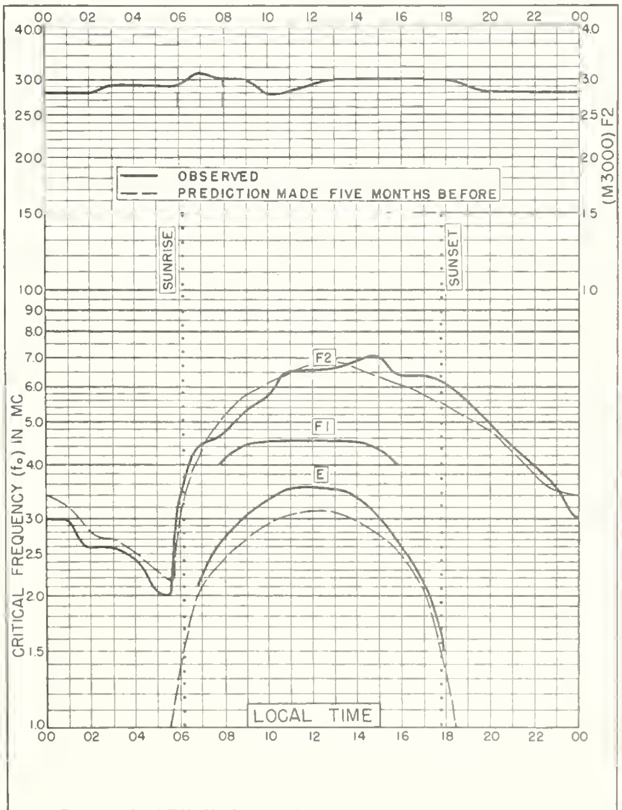

Fig. 59. HOBART, TASMANIA
42.8°S, 147.4°E SEPTEMBER 1951

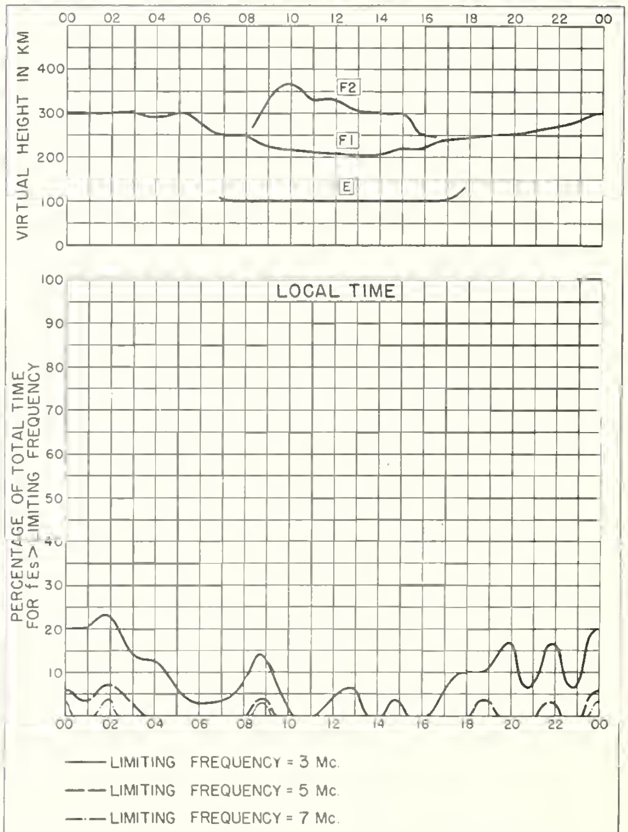

Fig. 60. HOBART, TASMANIA SEPTEMBER 1951

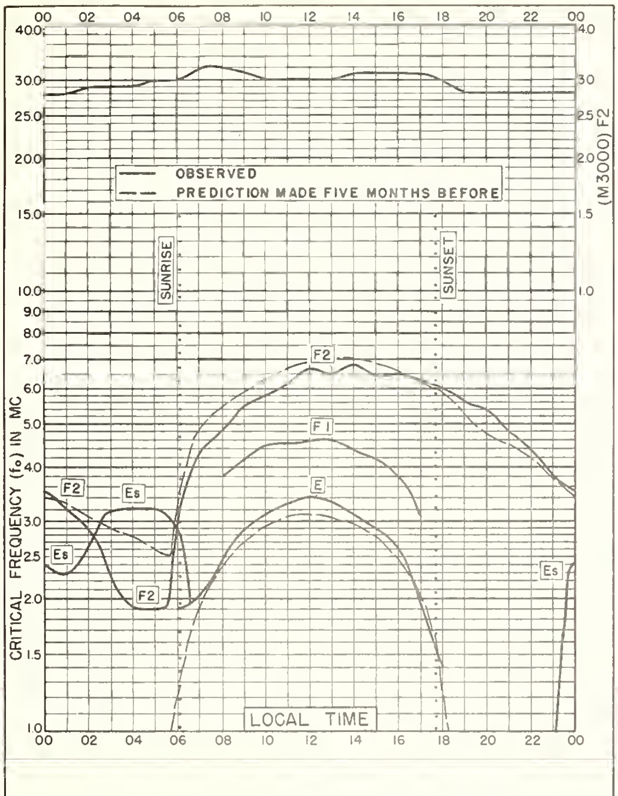

Fig. 61. CHRISTCHURCH, N. Z.
43.6° S, 172.7°E SEPTEMBER 1951

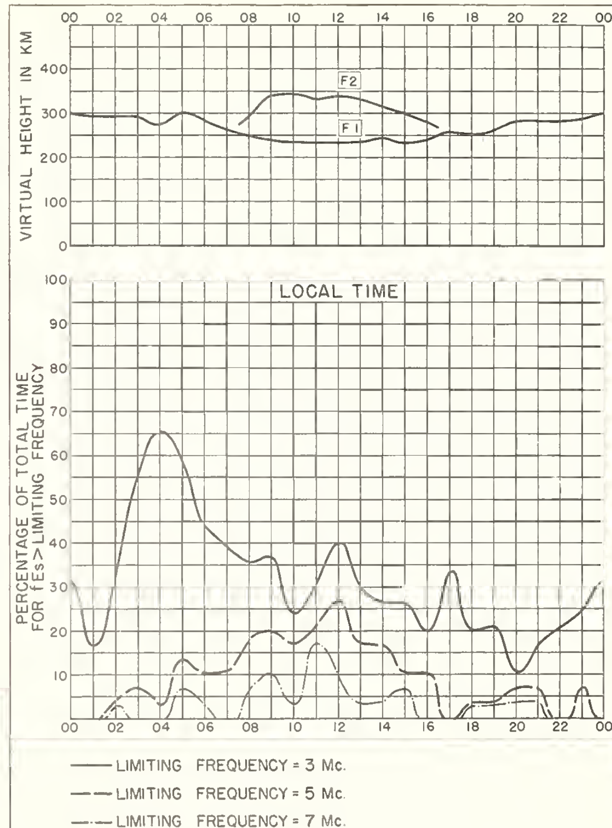

Fig. 62. CHRISTCHURCH, N. Z. SEPTEMBER 1951

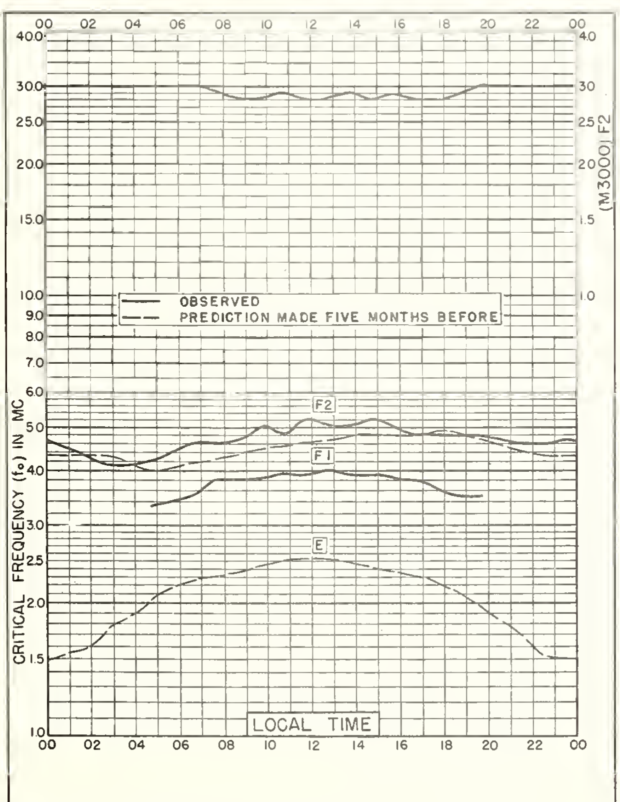

Fig. 63. RESOLUTE BAY, CANADA
74.7°N, 94.9°W AUGUST 1951

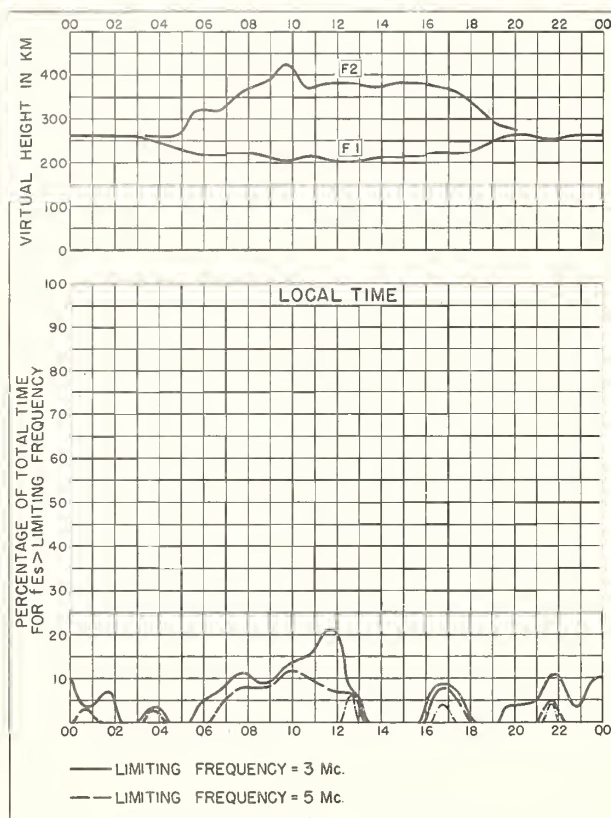

Fig. 64. RESOLUTE BAY, CANADA AUGUST 1951

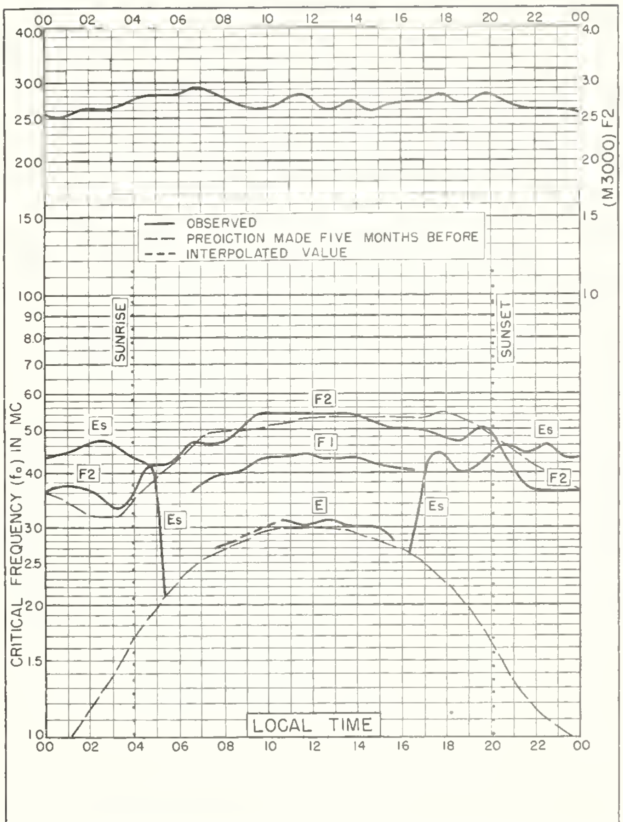

Fig. 65. REYKJAVIK, ICELAND
64.1° N, 21.8° W AUGUST 1951

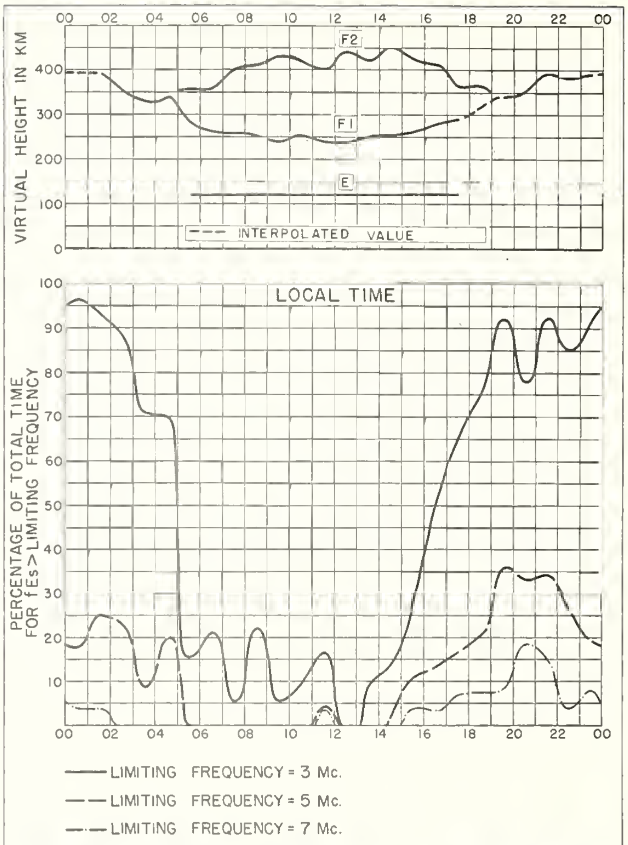

Fig. 66. REYKJAVIK, ICELAND AUGUST 1951

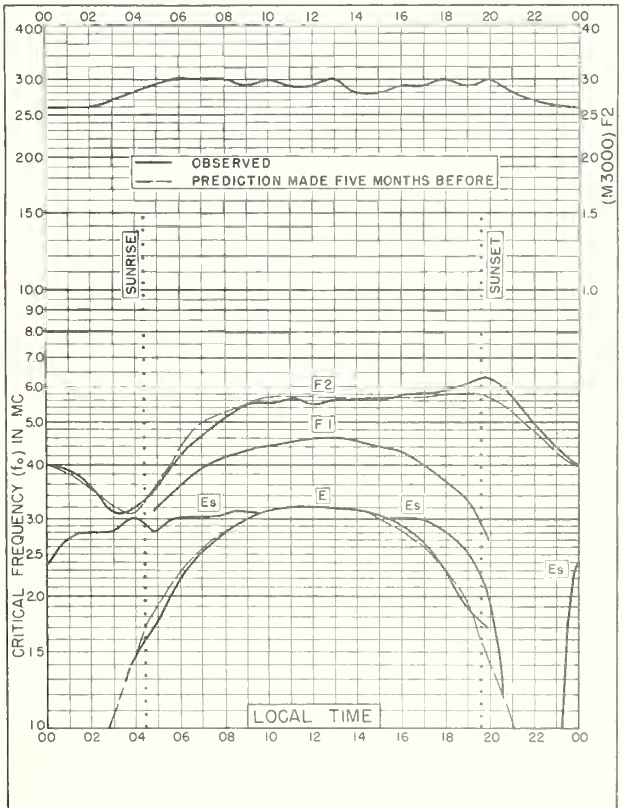

Fig. 67. FRASERBURGH, SCOTLAND
57.6° N, 2.1° W AUGUST 1951

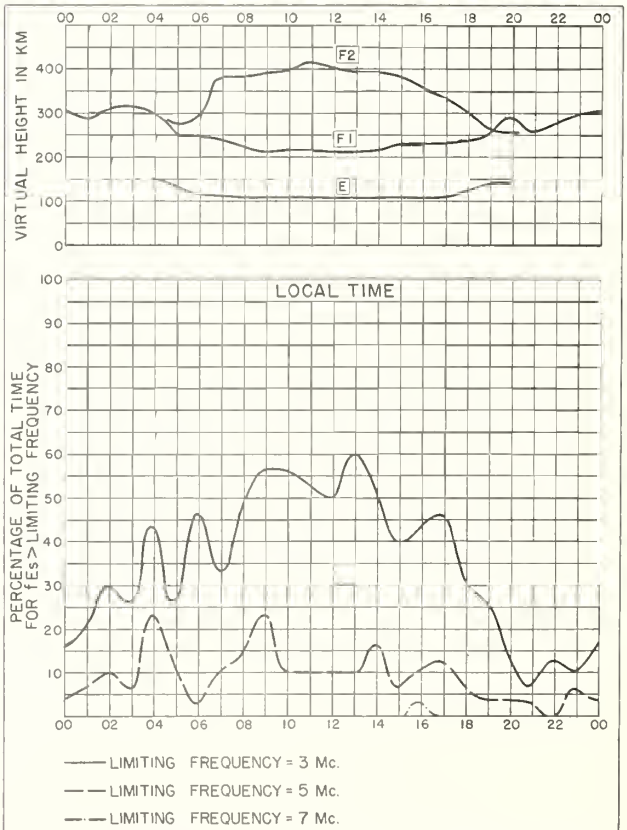

Fig. 68. FRASERBURGH, SCOTLAND AUGUST 1951

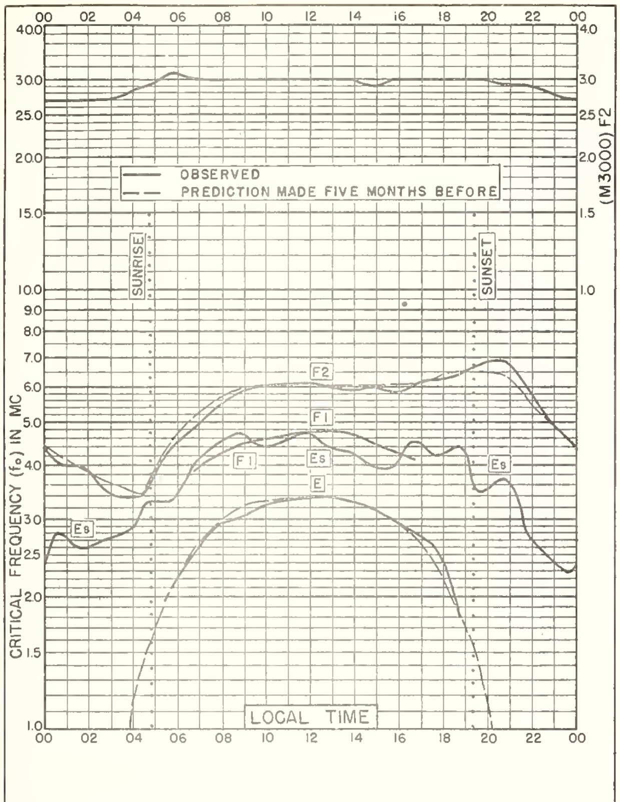

Fig. 69. LINDAU/HARZ, GERMANY
51.6°N, 10.1°E AUGUST 1951

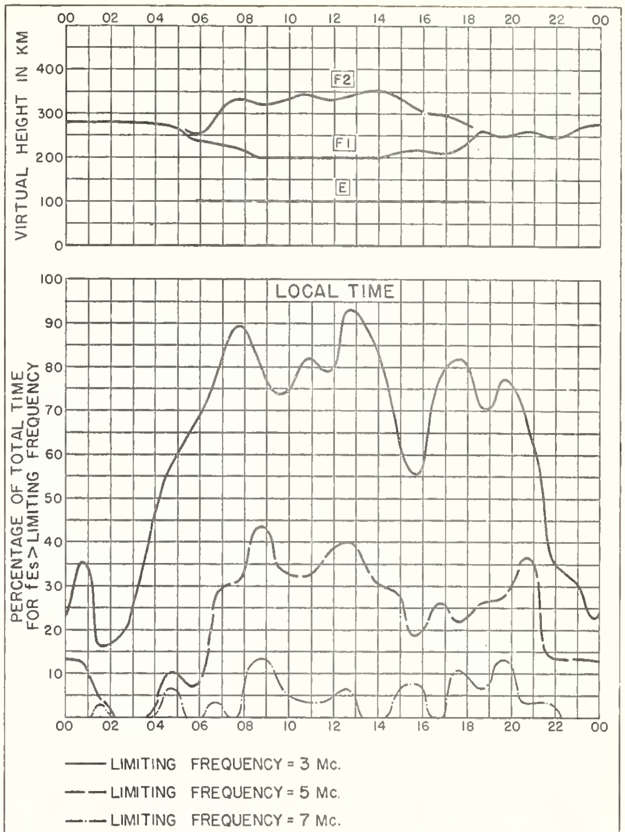

Fig. 70. LINDAU/HARZ, GERMANY AUGUST 1951

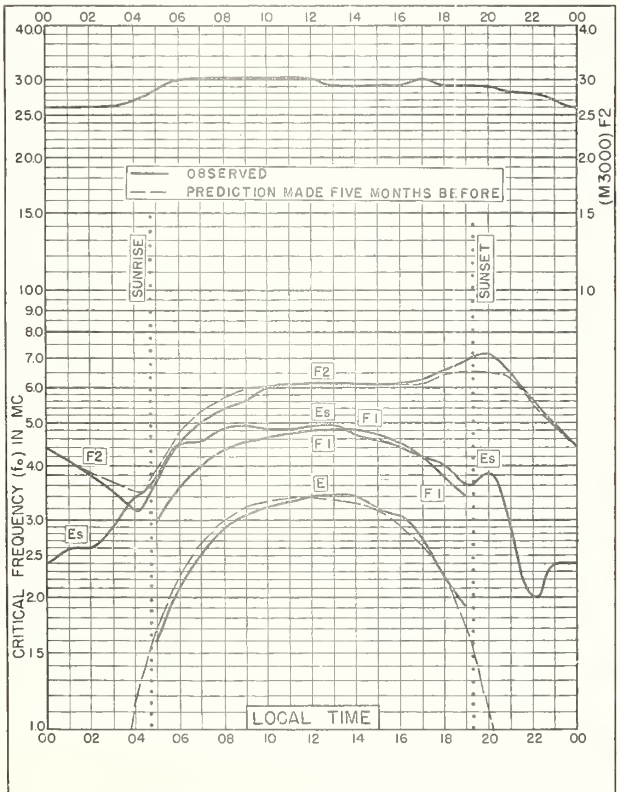

Fig. 71. SLOUGH, ENGLAND
51.5°N, 0.6°W AUGUST 1951

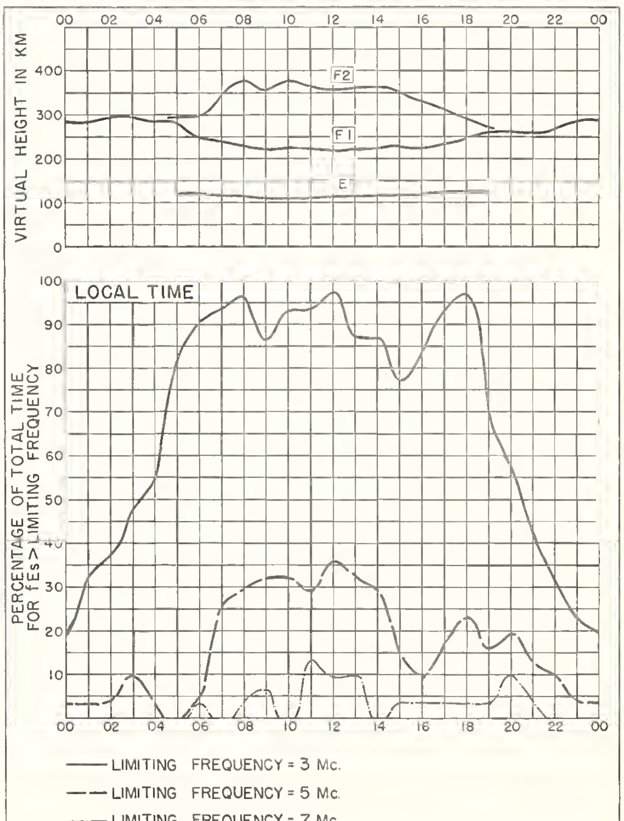

Fig. 72. SLOUGH, ENGLAND AUGUST 1951

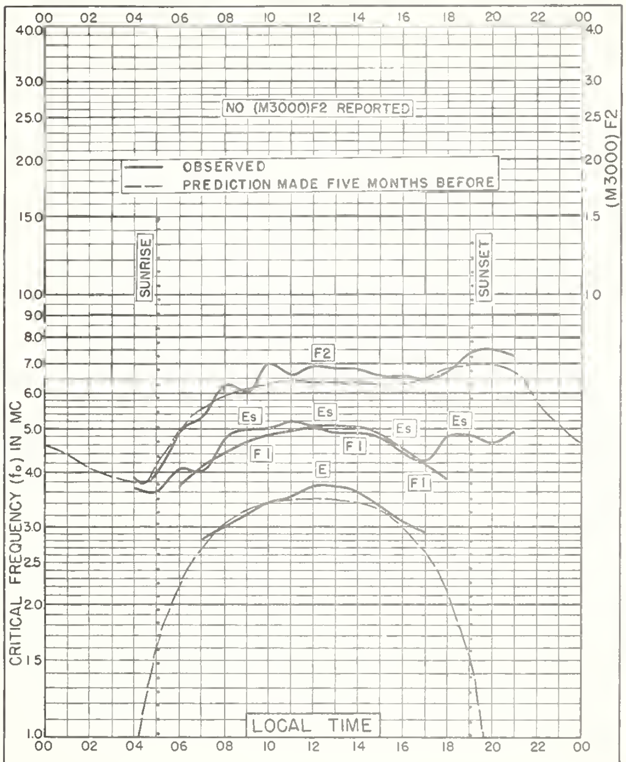

Fig. 73. GRAZ, AUSTRIA
47.1°N, 15.5°E AUGUST 1951

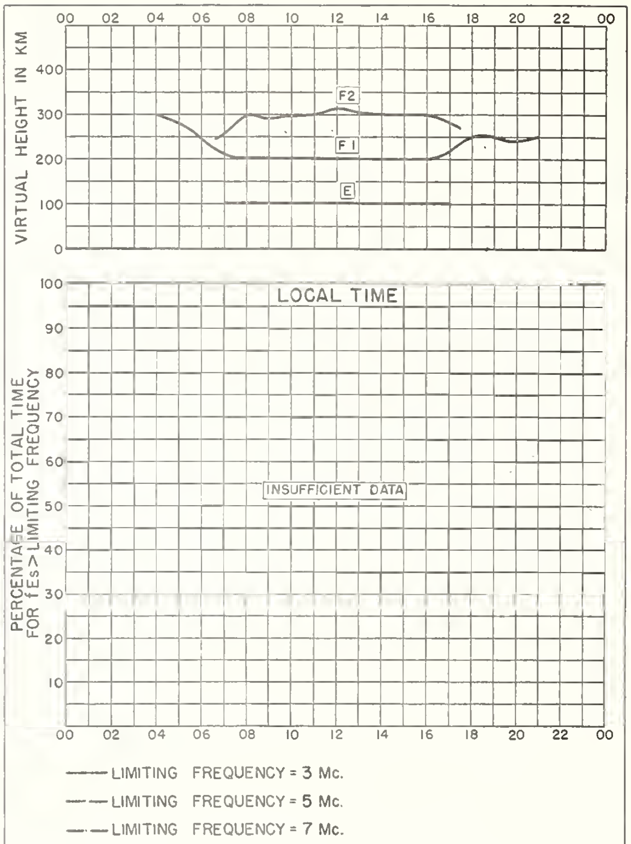

Fig. 74. GRAZ, AUSTRIA AUGUST 1951

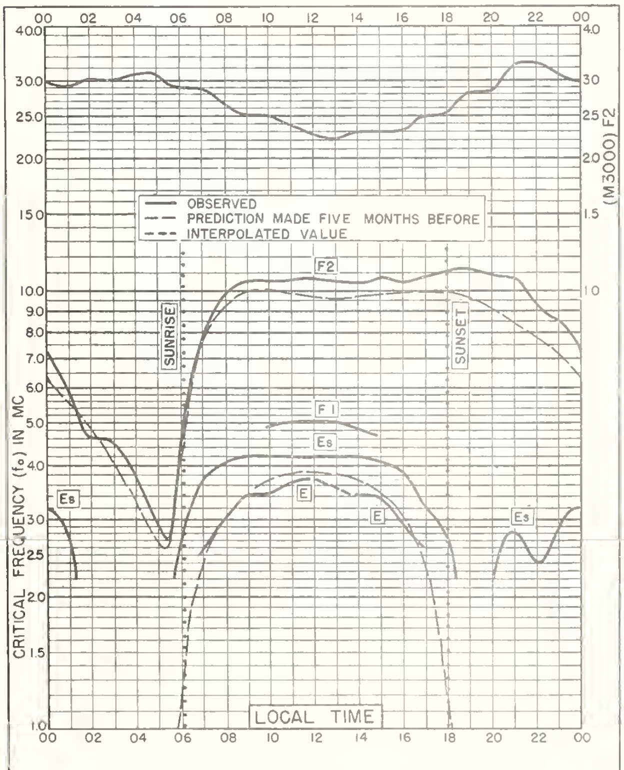

Fig. 75. SINGAPORE, BRITISH MALAYA
1.3° N, 103.8° E AUGUST 1951

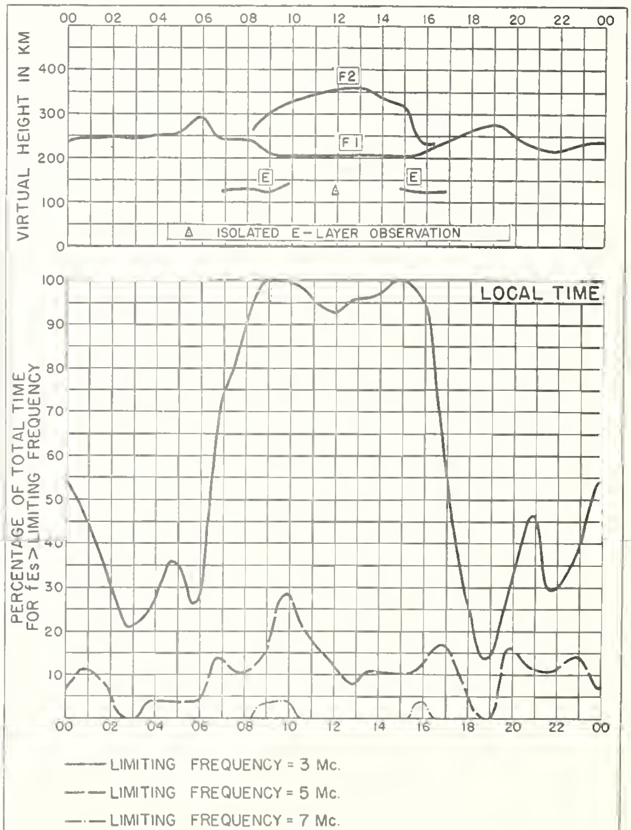

Fig. 76. SINGAPORE, BRITISH MALAYA AUGUST 1951

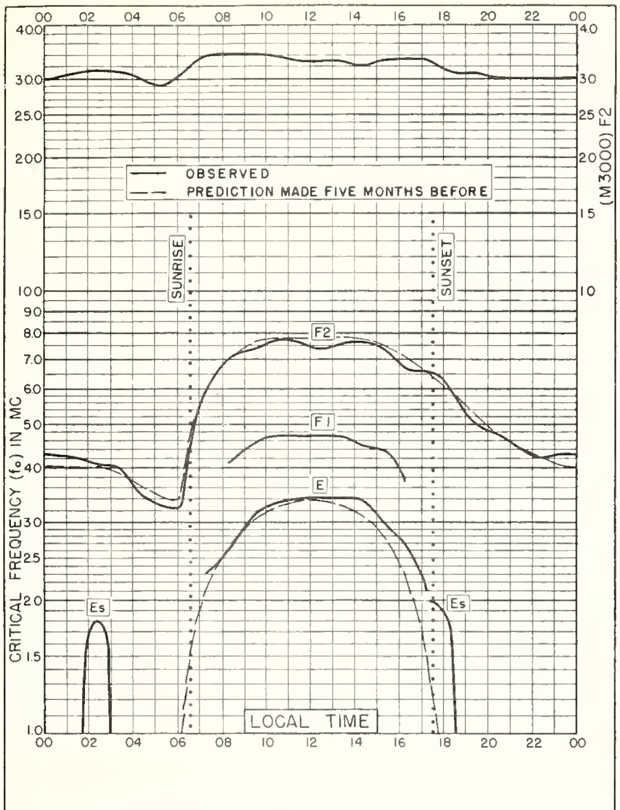

Fig. 77 BRISBANE, AUSTRALIA
27.5° S, 153.0° E AUGUST 1951

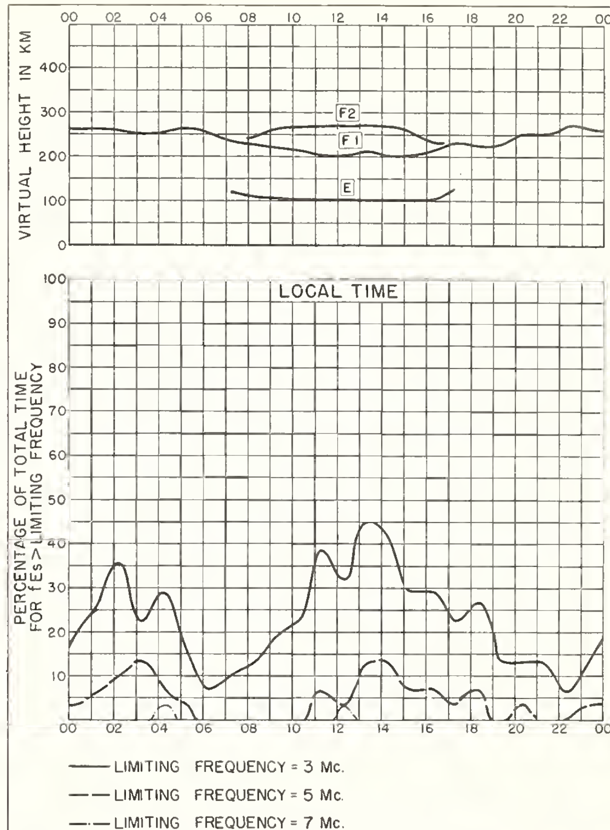

Fig. 78 BRISBANE, AUSTRALIA AUGUST 1951

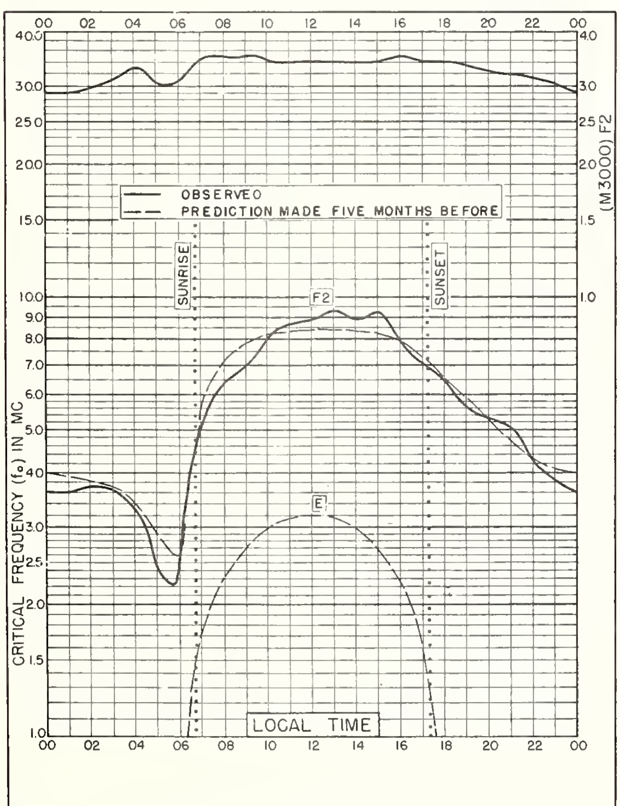

Fig. 79. BUENOS AIRES, ARGENTINA
34.5° S, 58.5° W AUGUST 1951

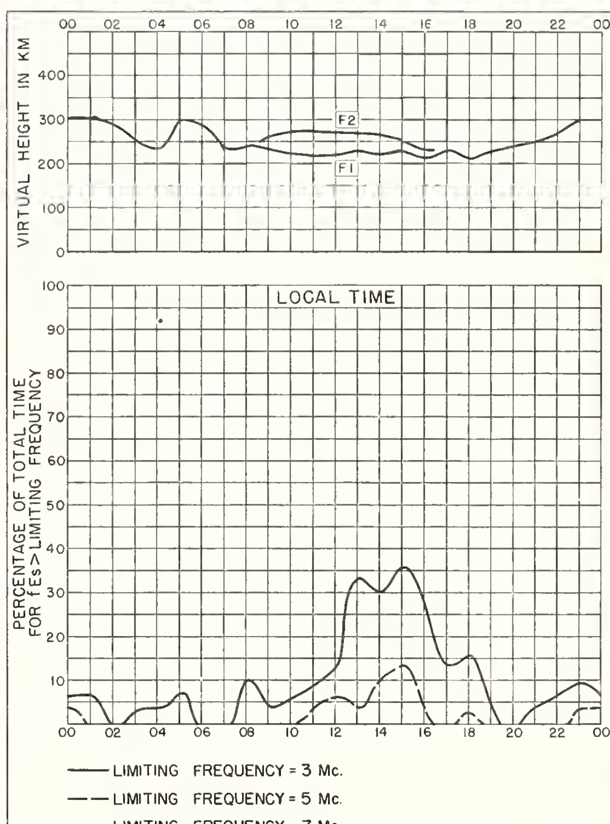

Fig. 80. BUENOS AIRES, ARGENTINA AUGUST 1951

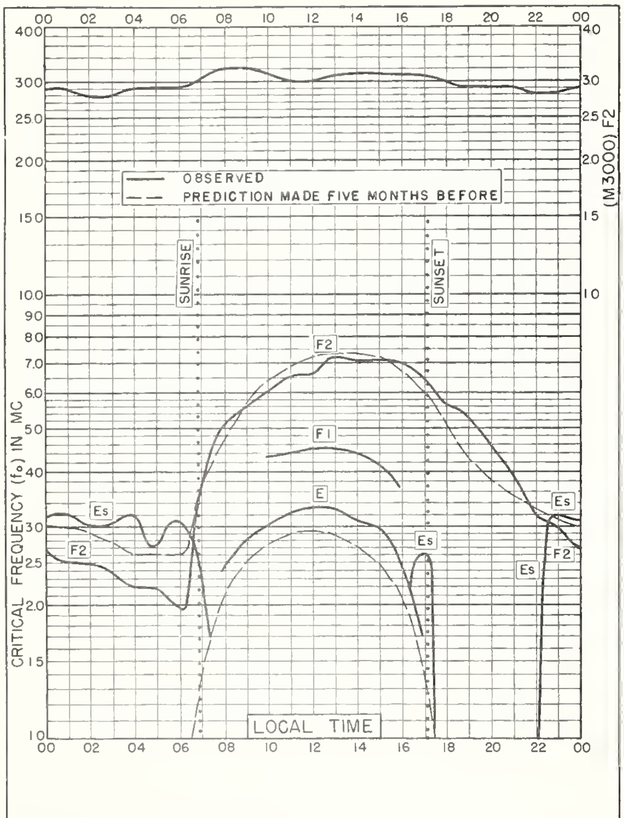

Fig. 81. HOBART, TASMANIA
42.8° S, 147.4°E AUGUST 1951

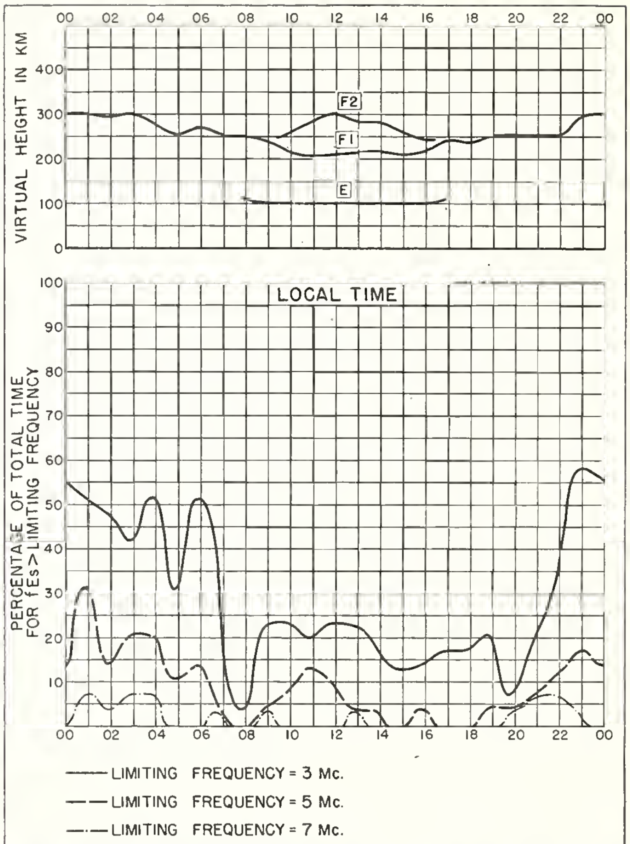

Fig. 82. HOBART, TASMANIA AUGUST 1951

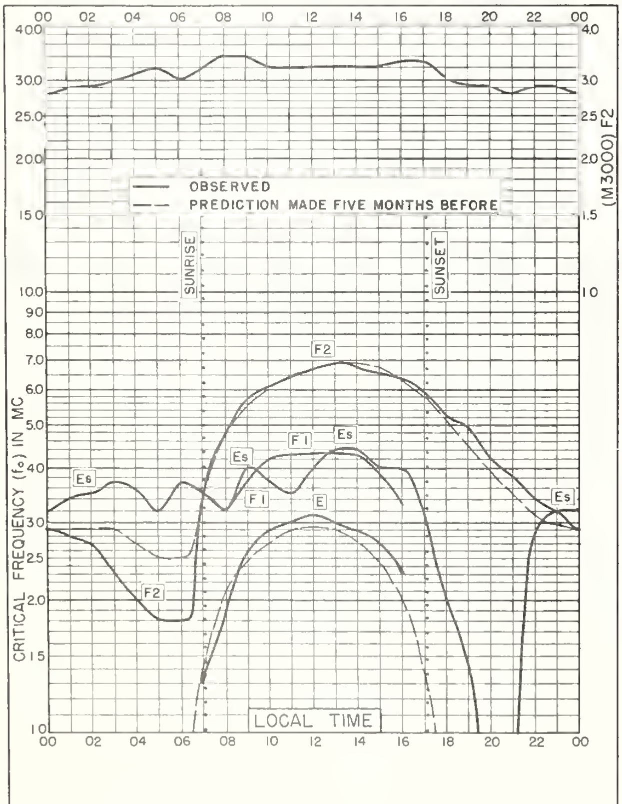

Fig. 83. CHRISTCHURCH, N Z.
43.6° S, 172.7°E AUGUST 1951

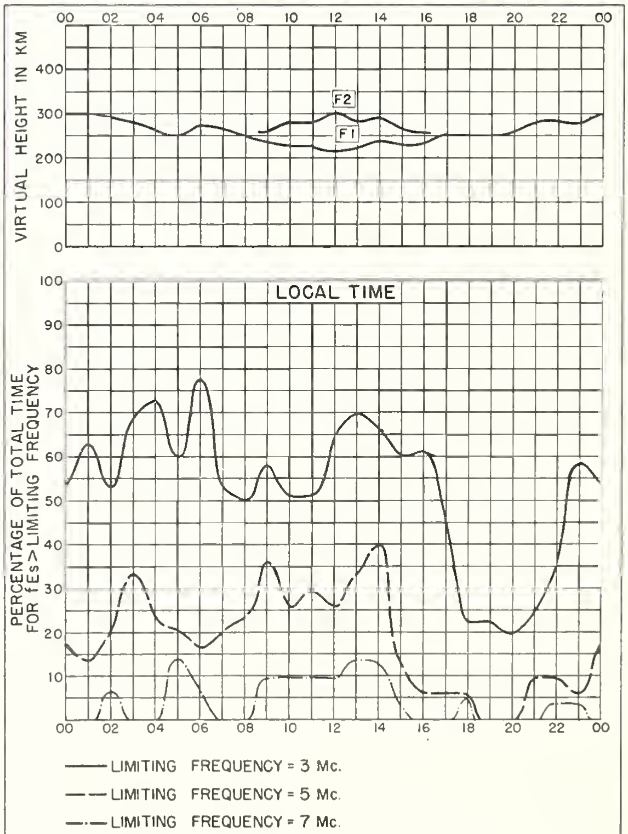

Fig. 84. CHRISTCHURCH, N. Z. AUGUST 1951

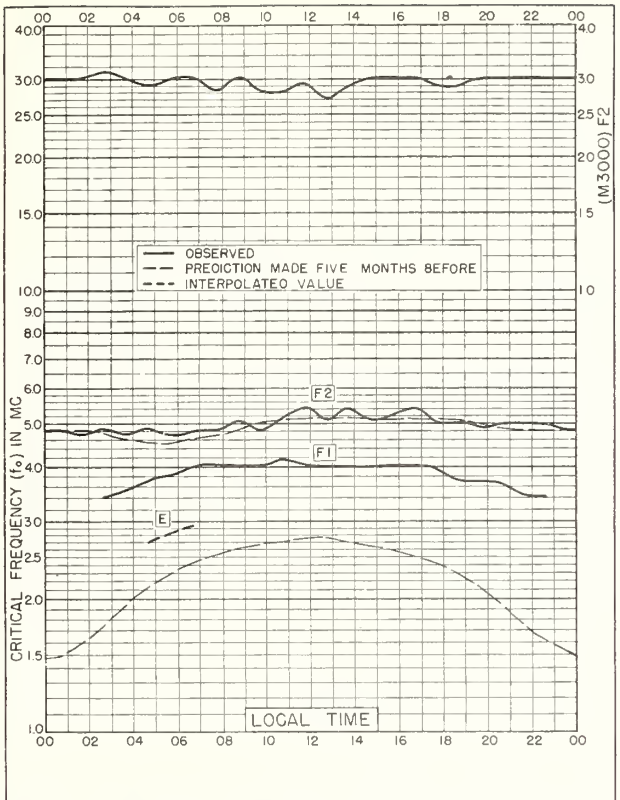

Fig. 85. RESOLUTE BAY, CANADA
74.7°N, 94.9°W JULY 1951

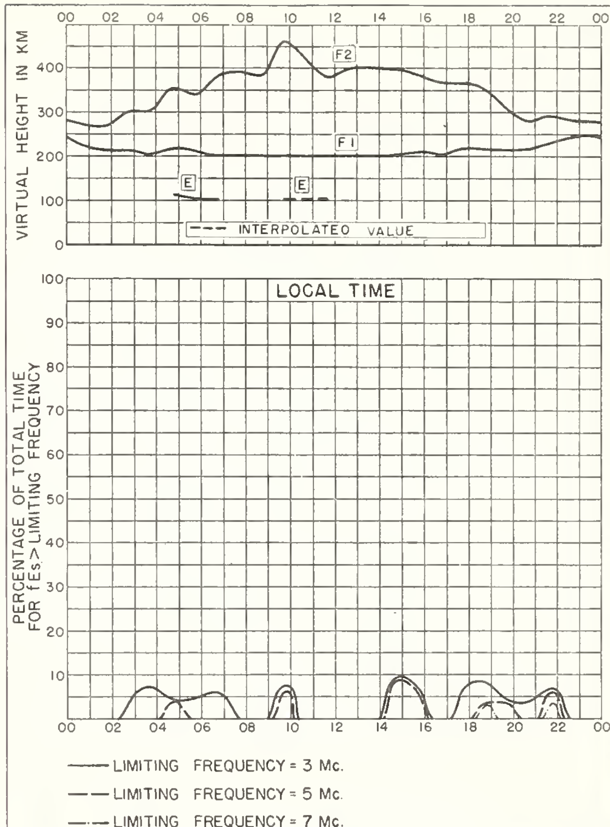

Fig. 86 RESOLUTE BAY, CANADA JULY 1951

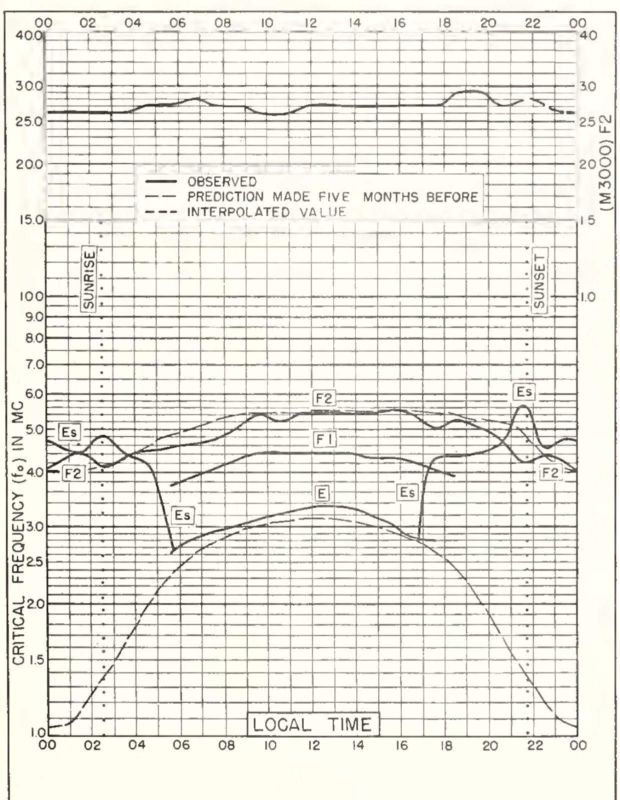

Fig. 87. REYKJAVIK, ICELAND
64.1° N, 21.8° W JULY 1951

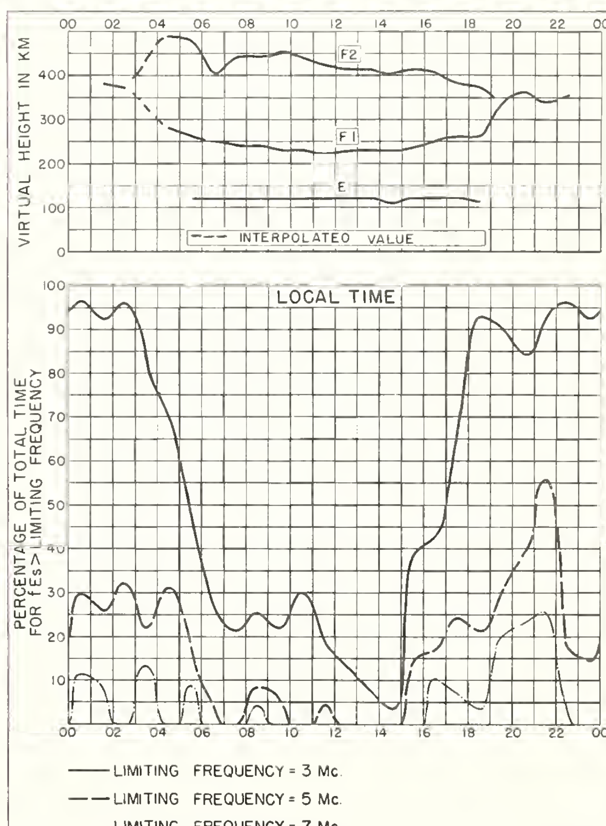

Fig. 88. REYKJAVIK, ICELAND JULY 1951

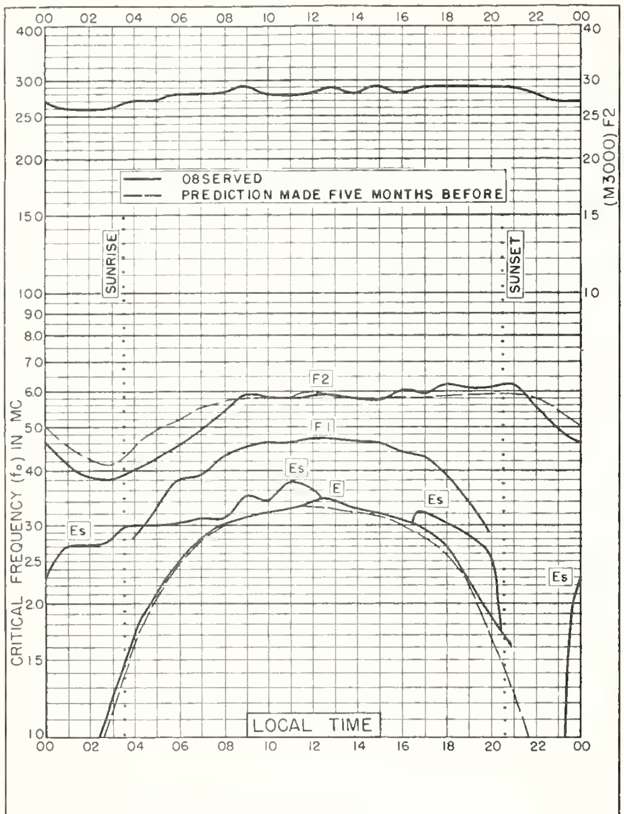

Fig 89. FRASERBURG, SCOTLAND
57.6°N, 2.1°W JULY 1951

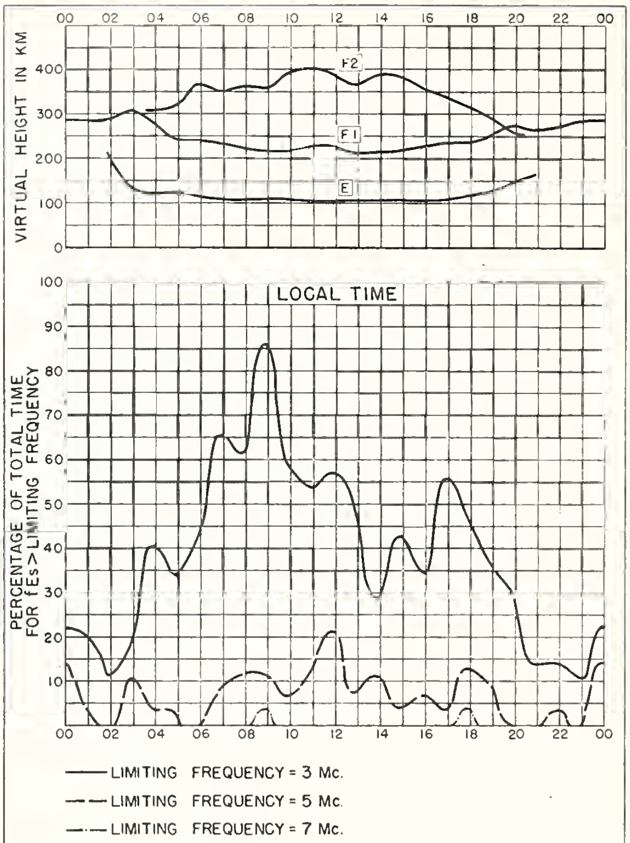

Fig. 90. FRASERBURG, SCOTLAND JULY 1951

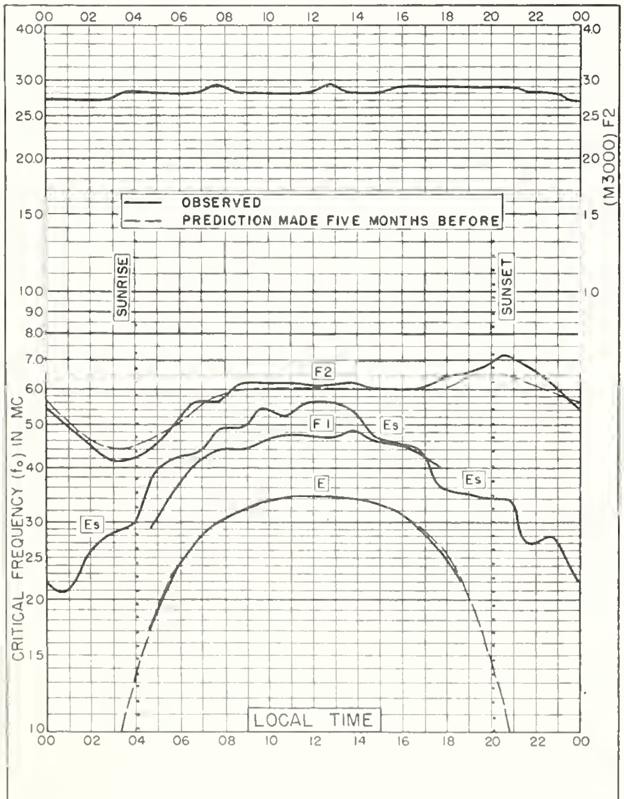

Fig. 91 LINDAU / HARZ, GERMANY
51.6°N, 10.1°E JULY 1951

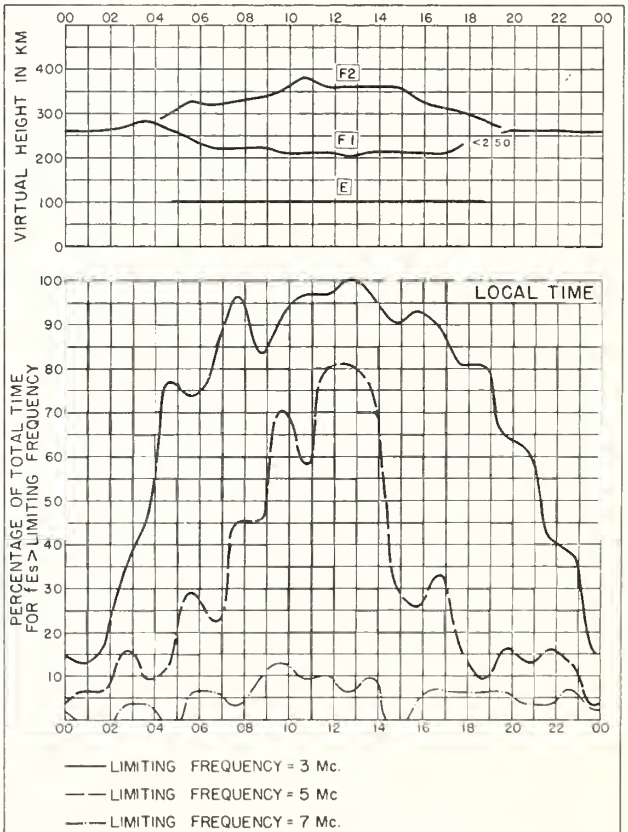

Fig. 92. LINDAU / HARZ, GERMANY JULY 1951

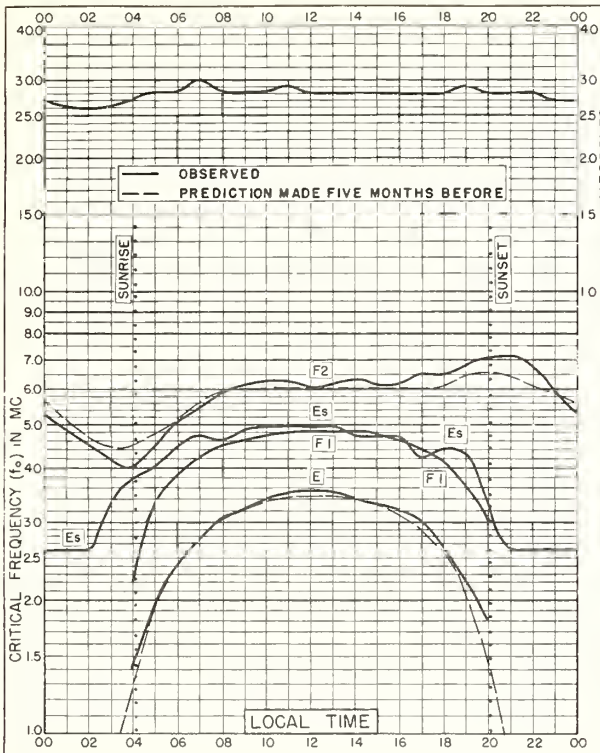

Fig. 93. SLOUGH, ENGLAND
51.5°N, 0.6°W JULY 1951

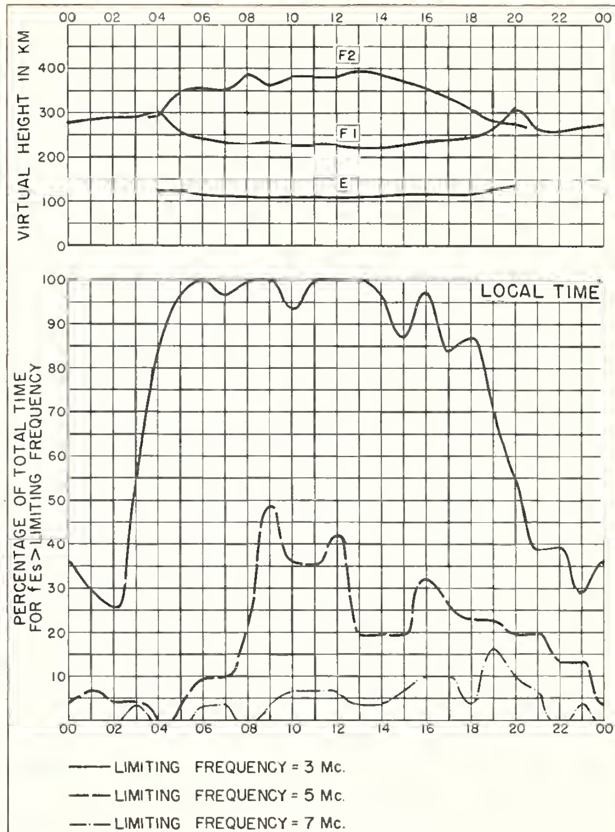

Fig. 94. SLOUGH, ENGLAND JULY 1951

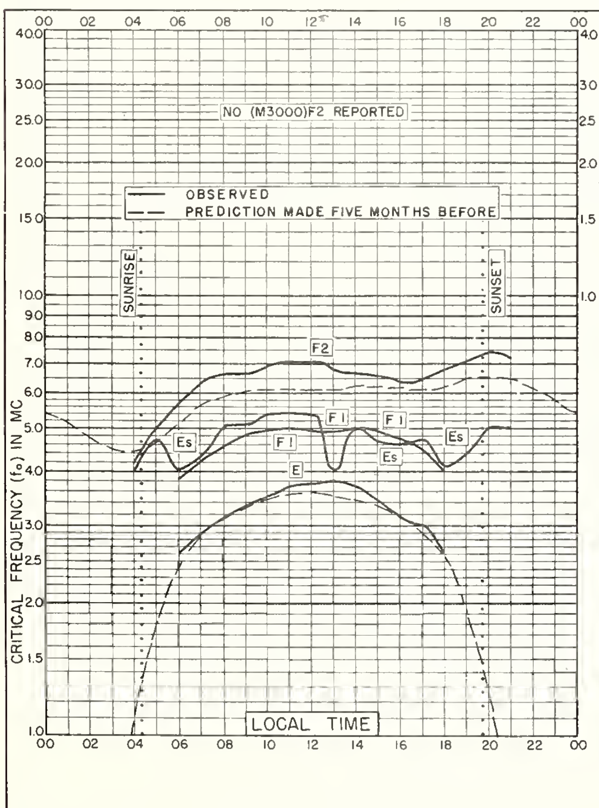

Fig. 95. GRAZ, AUSTRIA
47.1° N, 15.5° E JULY 1951

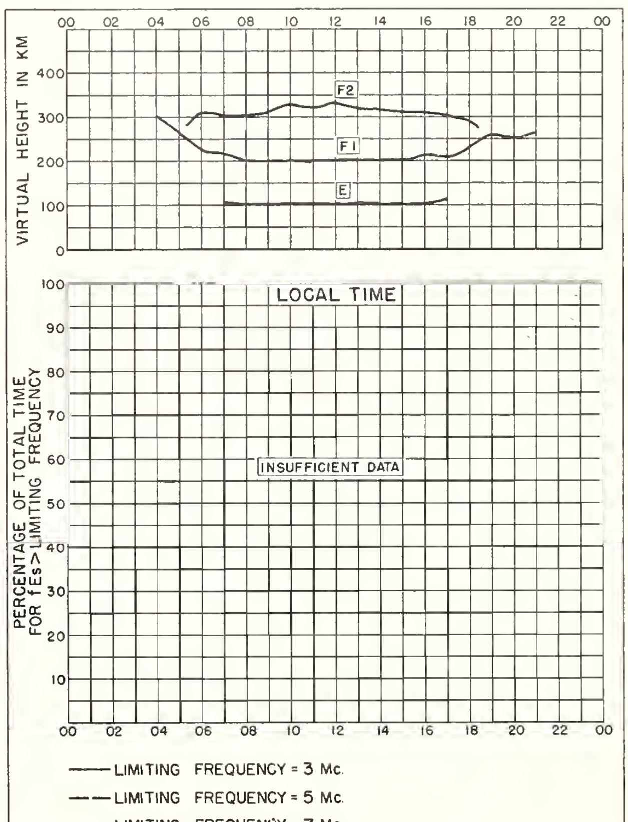

Fig. 96. GRAZ, AUSTRIA JULY 1951

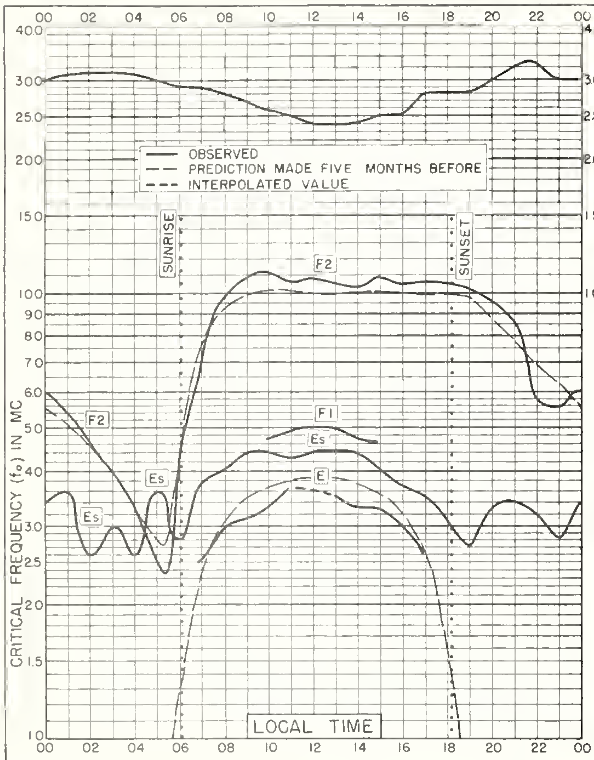

Fig. 97. SINGAPORE, BRIT. MALAYA
1.3°N, 103.8°E JULY 1951

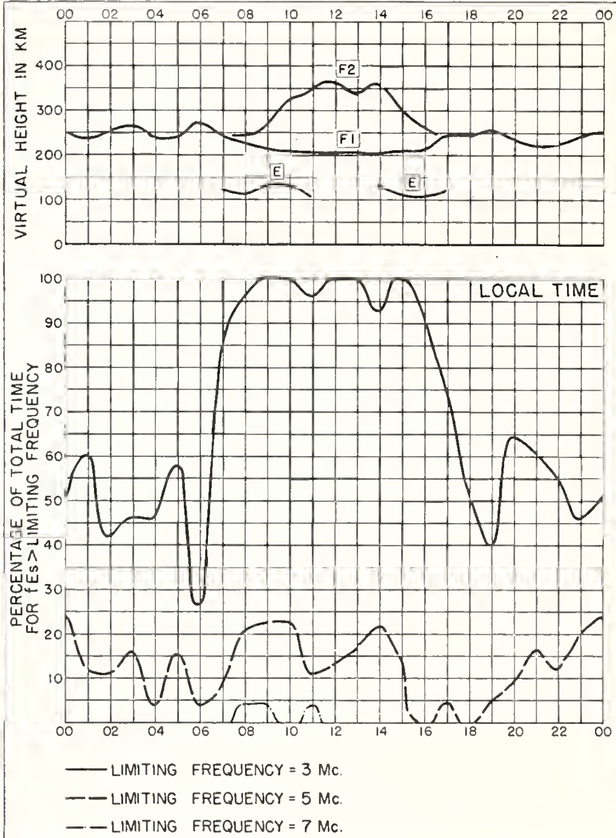

Fig. 98. SINGAPORE, BRIT. MALAYA JULY 1951

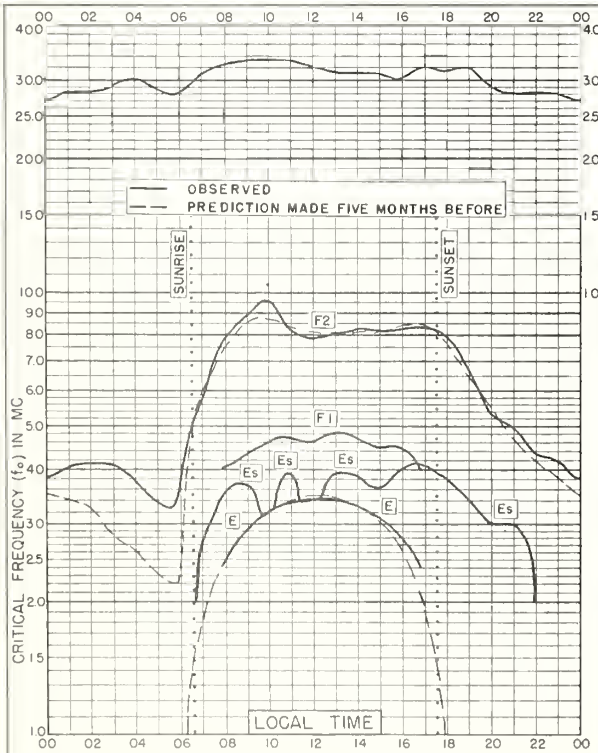

Fig. 99. RAROTONGA I.
21.3° S, 159.8° W JULY 1951

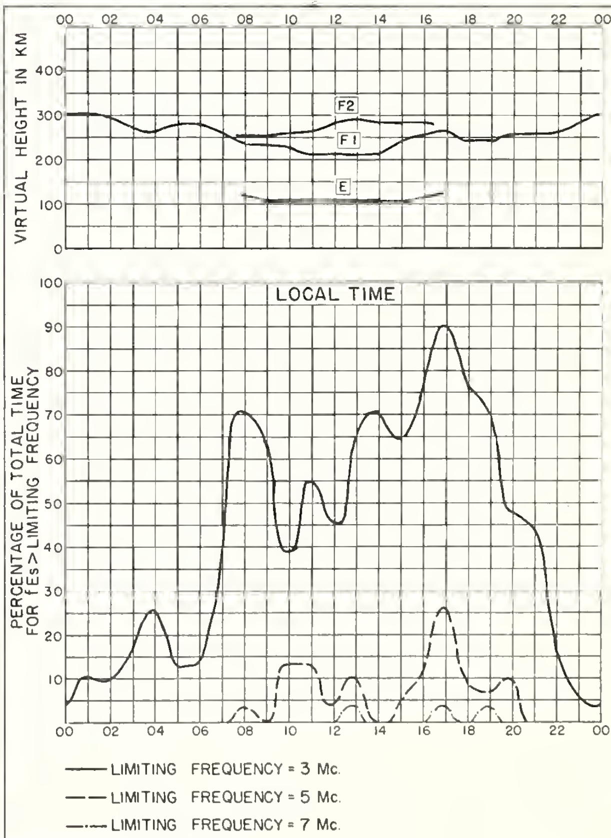

Fig. 100. RAROTONGA I. JULY 1951

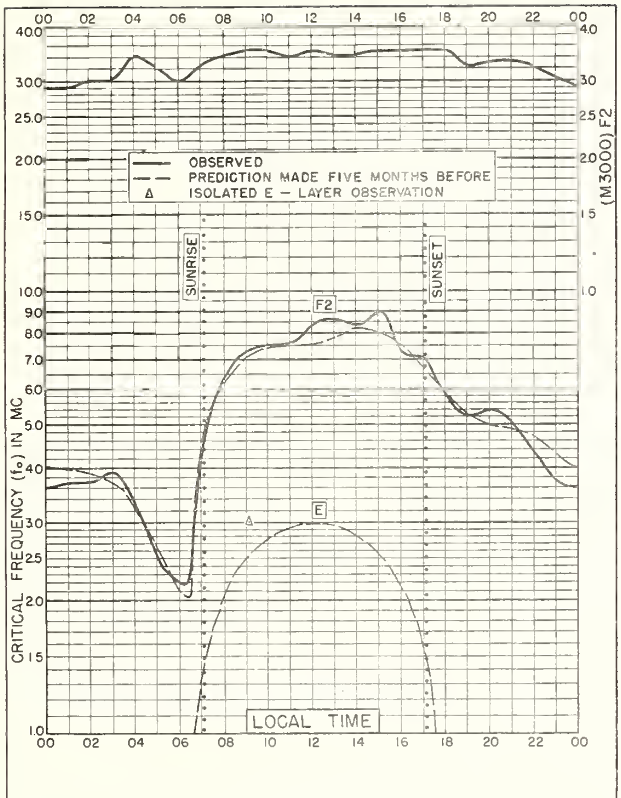

Fig. 101 BUENOS AIRES, ARGENTINA
34.5°S, 58.5°W JULY 1951

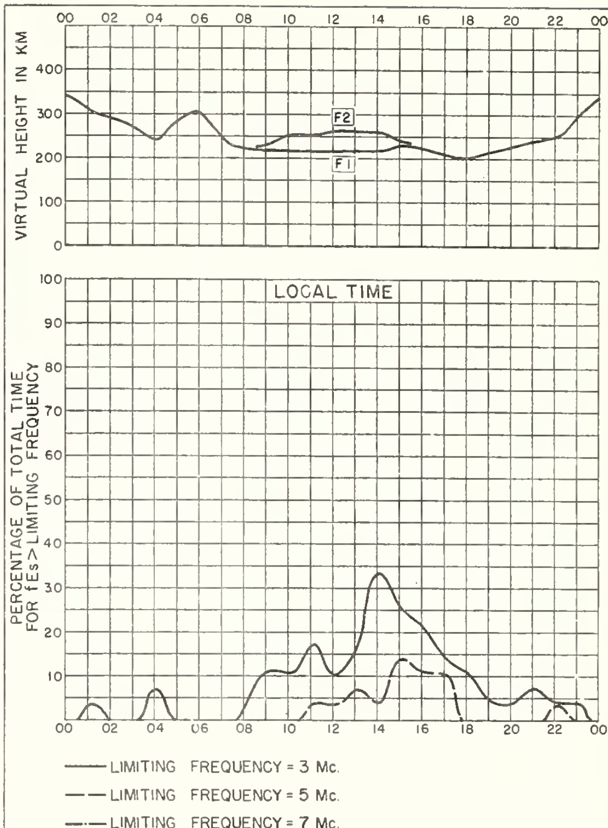

Fig. 102. BUENOS AIRES, ARGENTINA JULY 1951

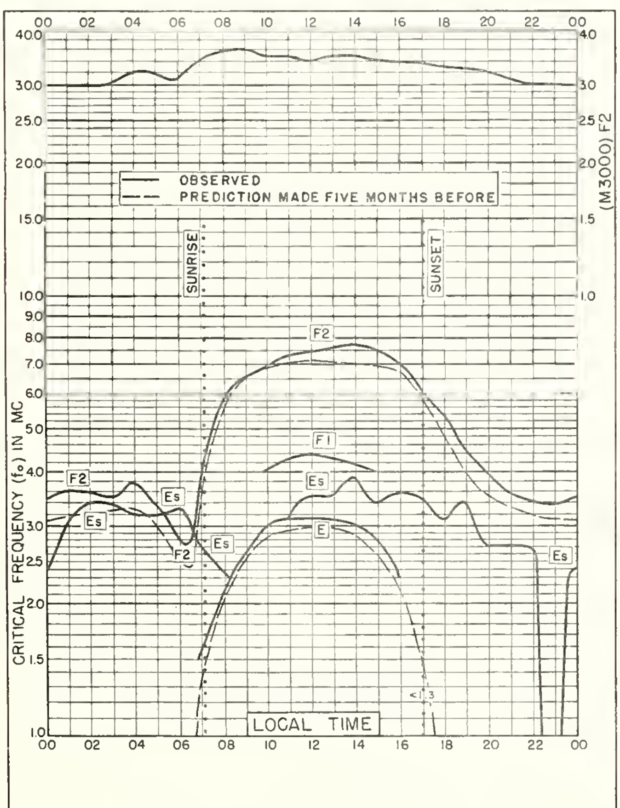

Fig. 103. CANBERRA, AUSTRALIA
35.3°S, 149.0°E JULY 1951

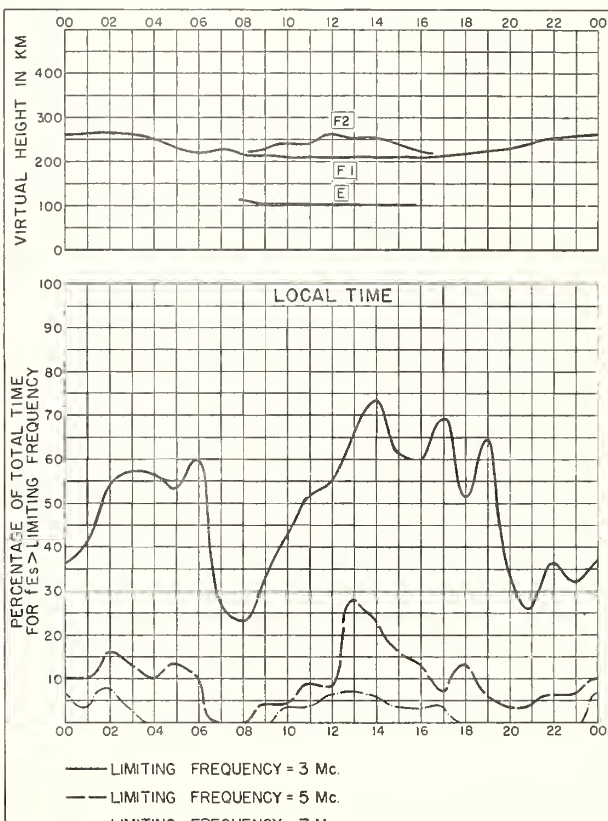

Fig. 104. CANBERRA, AUSTRALIA JULY 1951

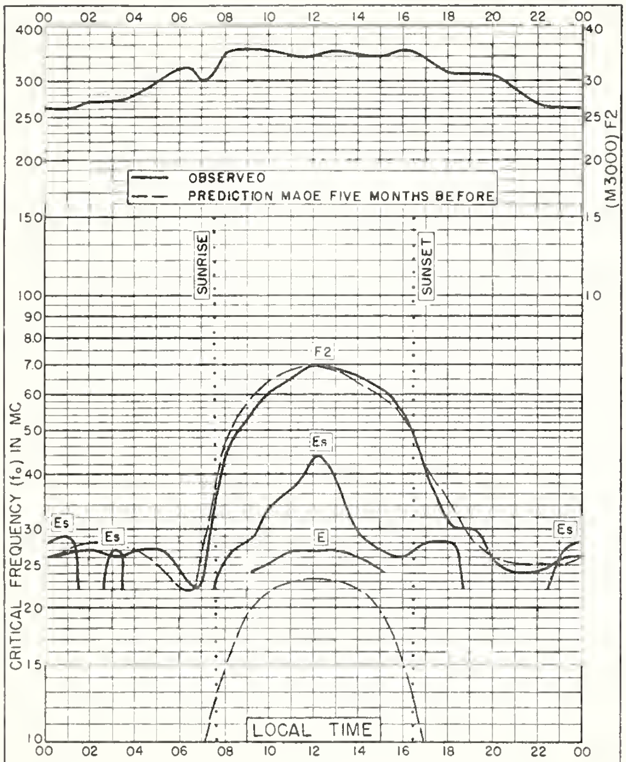

Fig. 105. FALKLAND IS.
51.7°S, 57.8°W JULY 1951

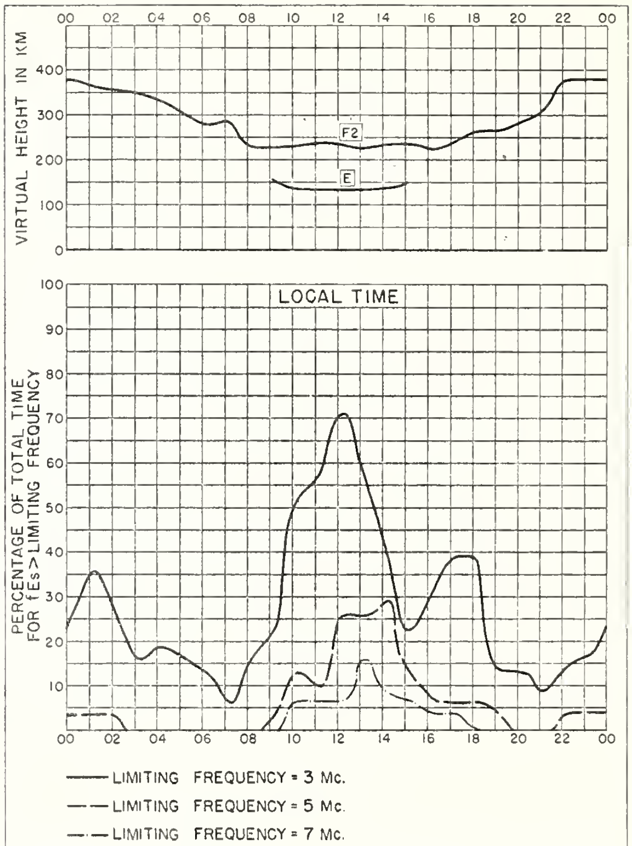

Fig. 106. FALKLAND IS. JULY 1951

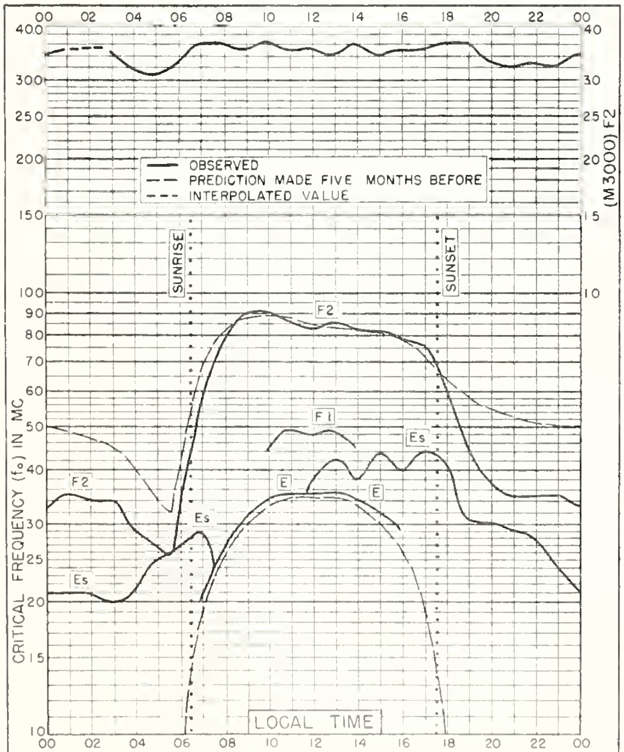

Fig 107. TOWNSVILLE, AUSTRALIA
19.3° S, 146.8° E JUNE 1951

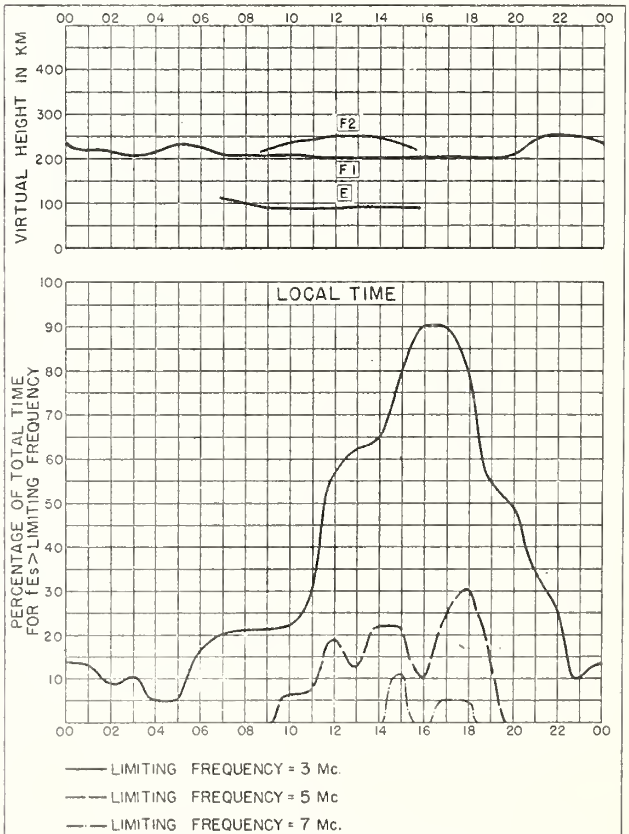

Fig. 108. TOWNSVILLE, AUSTRALIA JUNE 1951

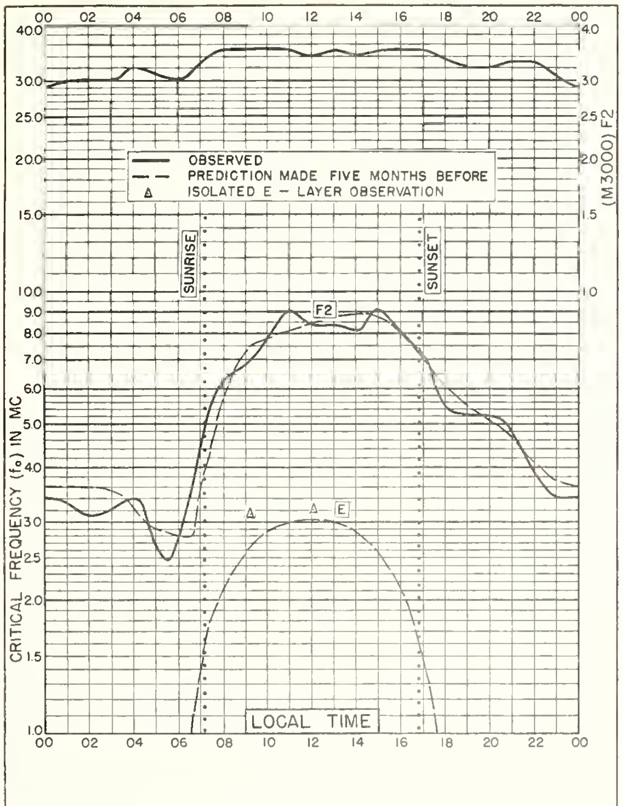

Fig. 109. BUENOS AIRES, ARGENTINA
34.5° S, 58.5° W
JUNE 1951

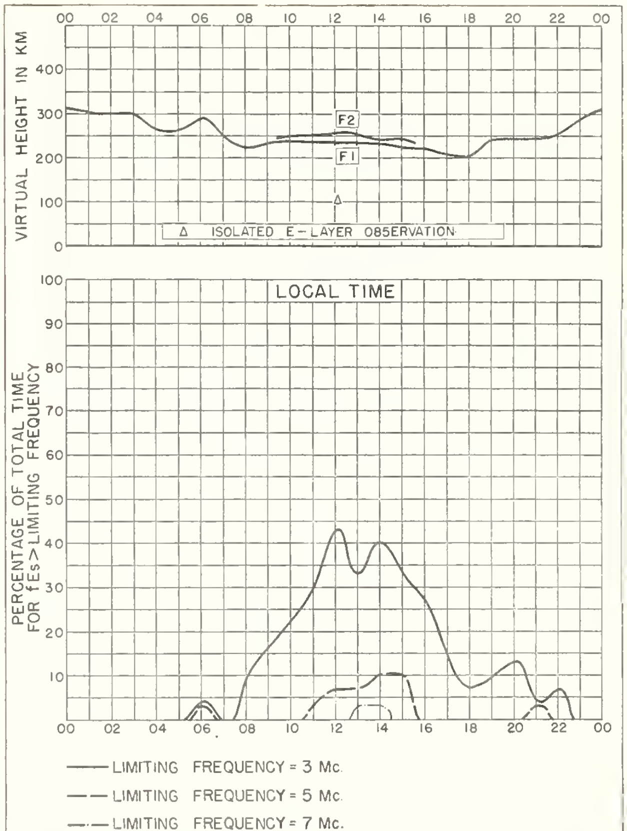

Fig. 110. BUENOS AIRES, ARGENTINA
JUNE 1951

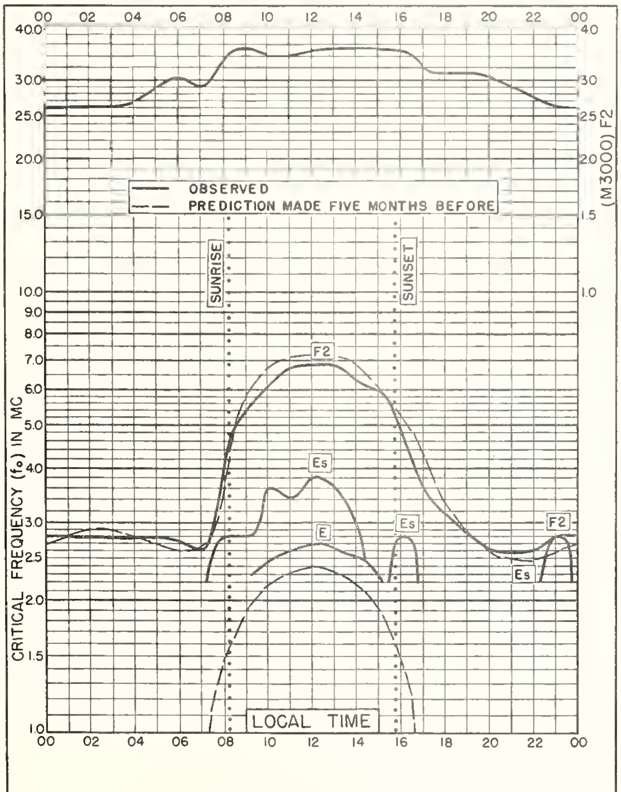

Fig. 111. FALKLAND IS.
51.7°S, 57.8°W
JUNE 1951

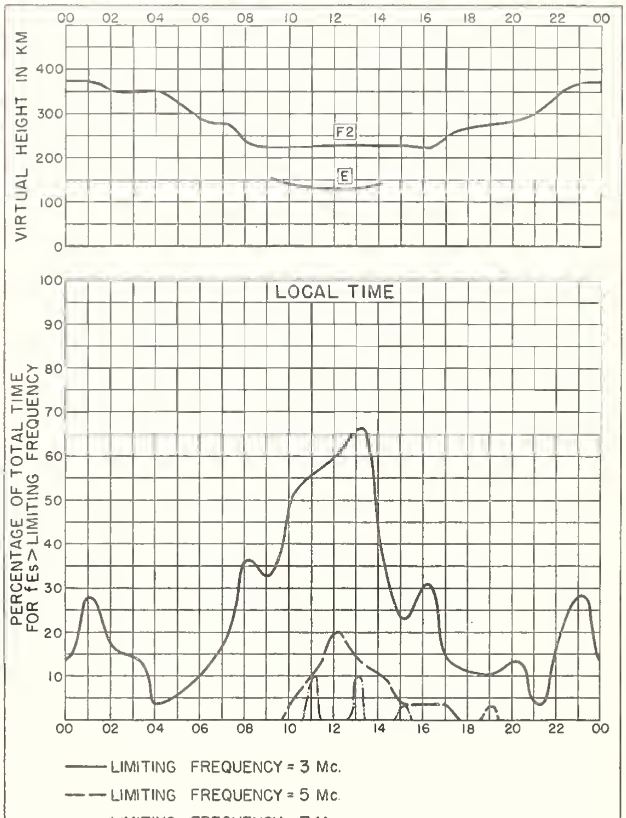

Fig. 112. FALKLAND IS.
JUNE 1951

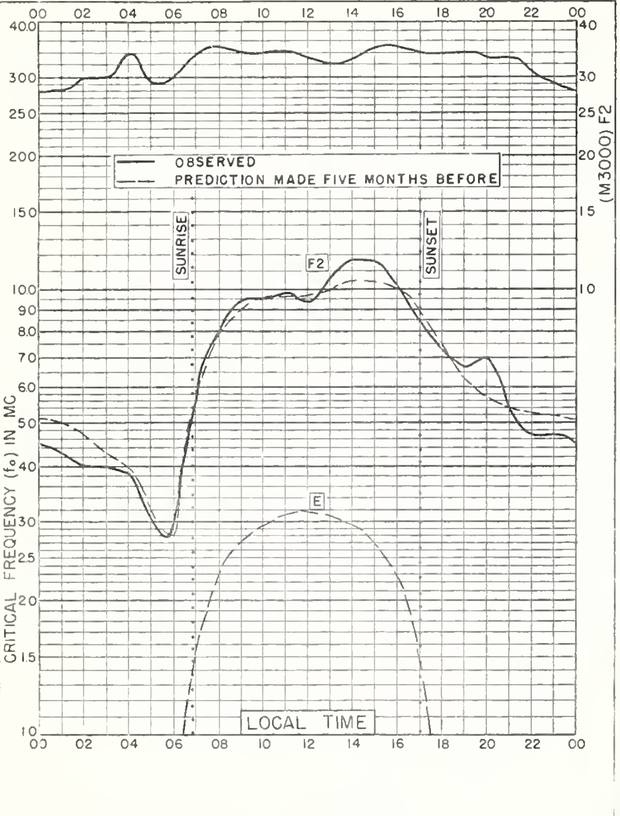

Fig. 113 BUENOS AIRES, ARGENTINA
34.5° S, 58.5° W MAY 1951

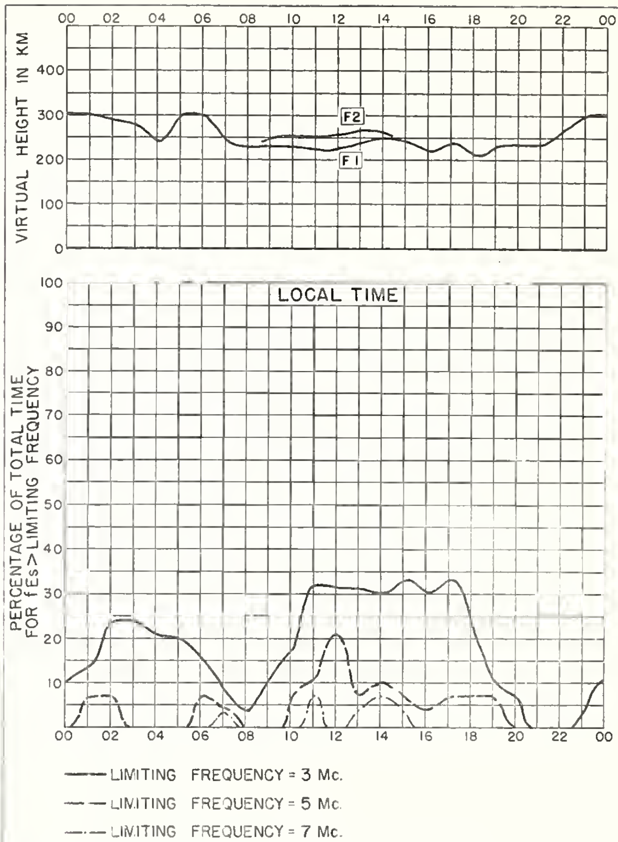

Fig. 114. BUENOS AIRES, ARGENTINA MAY 1951

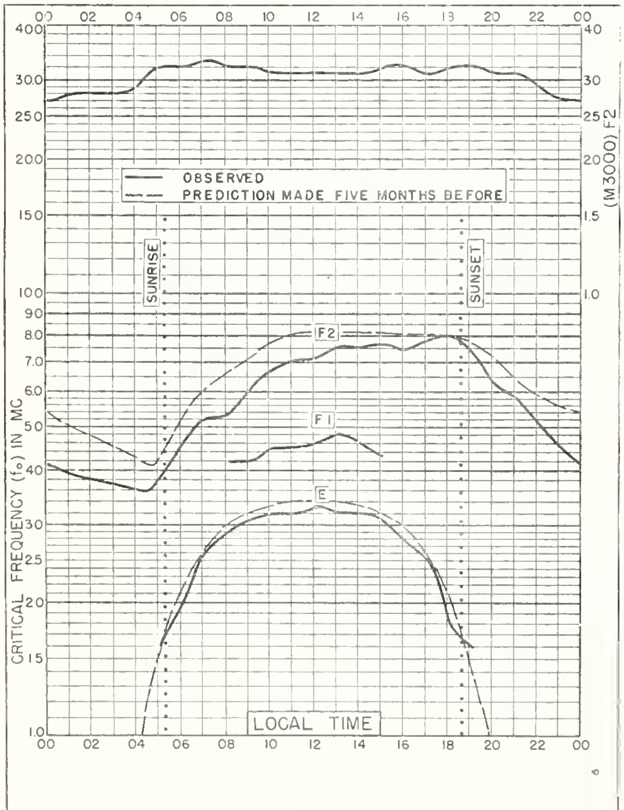

Fig. 115. DOMONT, FRANCE
49.0°N, 2.3°E APRIL 1951

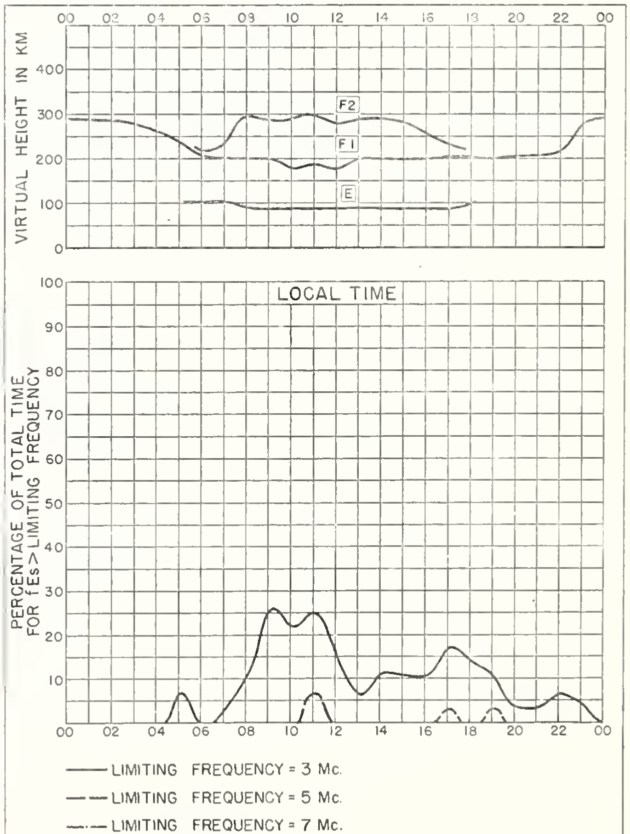

Fig. 116. DOMONT, FRANCE APRIL 1951

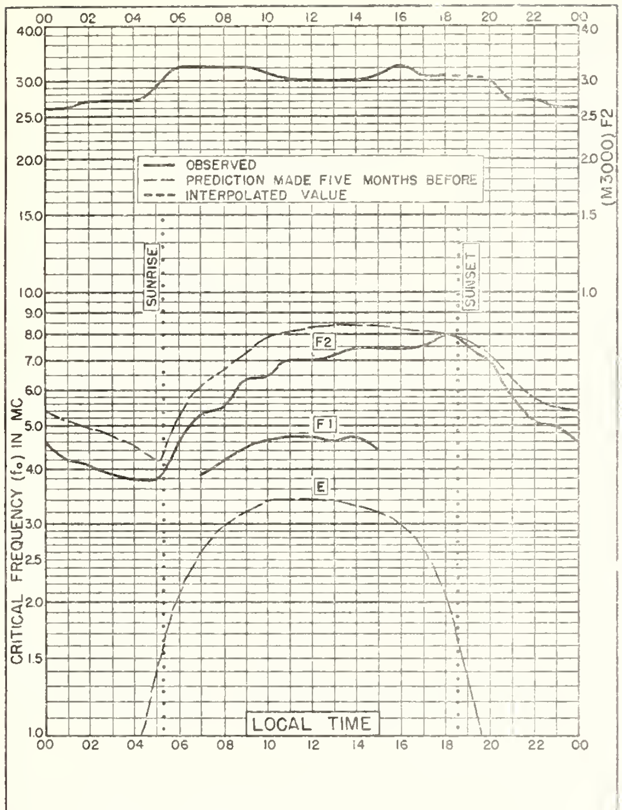

Fig. 117. POITIERS, FRANCE
46.6°N, 0.3°E APRIL 1951

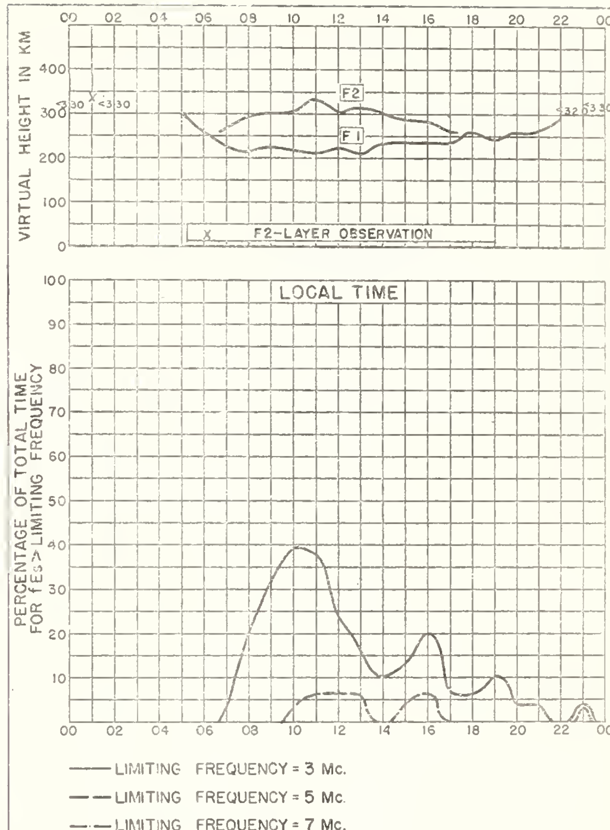

Fig. 118. POITIERS, FRANCE APRIL 1951

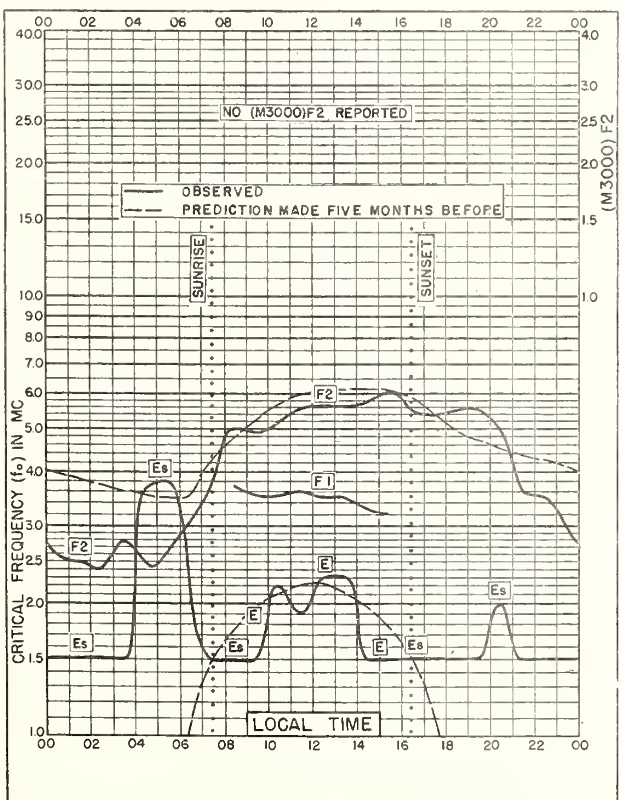

Fig. 119. TERRE ADELIE
66.8°S, 141.4°E APRIL 1951

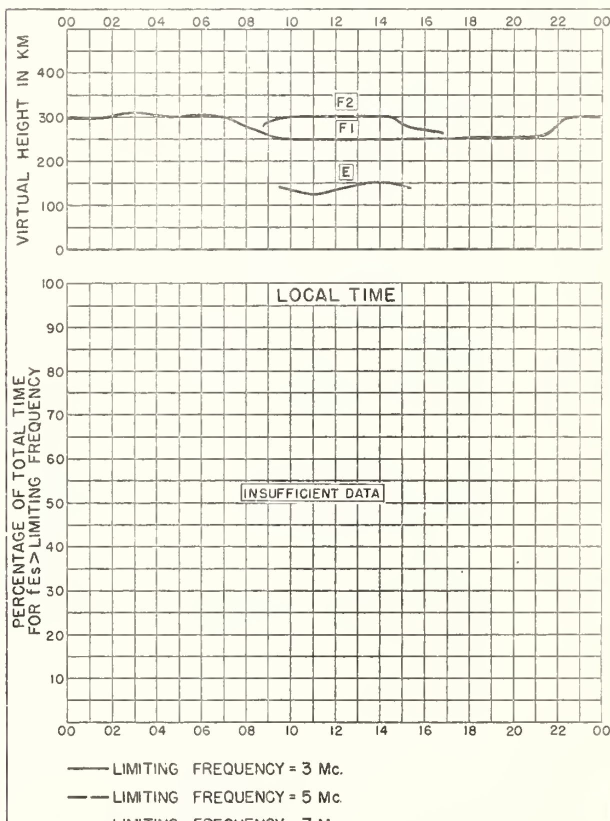

Fig. 120. TERRE ADELIE APRIL 1951

Index of Tables and Graphs of Ionospheric Data

in CRPL-F89

	Table page	Figure page
Akita, Japan		
September 1951	17	57
Anchorage, Alaska		
November 1951	14	47
Brisbane, Australia		
September 1951	18	59
August 1951	20	65
Buenos Aires, Argentina		
August 1951	20	65
July 1951	22	71
June 1951	23	73
May 1951	23	74
Canberra, Australia		
July 1951	22	71
Capetown, Union of South Africa		
October 1951	16	54
Christchurch, New Zealand		
September 1951	19	61
August 1951	20	66
De Bilt, Holland		
October 1951	15	51
Domont, France		
April 1951	23	74
Fairbanks, Alaska		
October 1951	15	50
Falkland Is.		
July 1951	22	72
June 1951	23	73
Formosa, China		
September 1951	18	59
Fort Chimo, Canada		
September 1951	17	55
Fraserburgh, Scotland		
August 1951	19	62
July 1951	21	68
Graz, Austria		
September 1951	17	56
August 1951	20	64
July 1951	21	69
Hobart, Tasmania		
September 1951	18	60
August 1951	20	66
Johannesburg, Union of South Africa		
October 1951	16	53
Lindau/Harz, Germany		
September 1951	17	55
August 1951	19	63
July 1951	21	68

Index (CRPL-F89, continued)

	Table page	Figure page
Maui, Hawaii		
November 1951	15	49
Narsarssuak, Greenland		
November 1951	14	47
Oslo, Norway		
November 1951	14	48
Ottawa, Canada		
October 1951	16	53
September 1951	17	56
Poitiers, France		
April 1951	23	75
Prince Rupert, Canada		
October 1951	15	50
Puerto Rico, West Indies		
November 1951	15	49
Rarotonga I.		
July 1951	22	70
Resolute Bay, Canada		
September 1951	16	54
August 1951	19	61
July 1951	21	67
Reykjavik, Iceland		
August 1951	19	62
July 1951	21	67
St. John's, Newfoundland		
October 1951	16	52
San Francisco, California		
November 1951	14	48
Schwarzenburg, Switzerland		
October 1951	16	52
Singapore, British Malaya		
August 1951	20	64
July 1951	22	70
Slough, England		
August 1951	19	63
July 1951	21	69
Terre Adelie		
April 1951	23	75
Tokyo, Japan		
September 1951	18	58
Townsville, Australia		
June 1951	22	72
Tromso, Norway		
November 1951	14	46
Wakkanai, Japan		
September 1951	17	57
Washington, D. C.		
December 1951	14	46
Watheroo, Western Australia		
September 1951	18	60
Winnipeg, Canada		
October 1951	15	51
Yamagawa, Japan		
September 1951	18	58

CRPL and IRPL Reports

[A list of CRPL Section Reports is available from the Central Radio Propagation Laboratory upon request]

Daily:

Radio disturbance warnings, every half hour from broadcast station WWV of the National Bureau of Standards.
Telephoned and telegraphed reports of ionospheric, solar, geomagnetic, and radio propagation data.

Weekly:

CRPL—J. Radio Propagation Forecast (of days most likely to be disturbed during following month).

Semimonthly:

CRPL—Ja. Semimonthly Frequency Revision Factors For CRPL Basic Radio Propagation Prediction Reports.

Monthly:

CRPL—D. Basic Radio Propagation Predictions—Three months in advance. (Dept. of the Army, TB 11-499-, monthly supplements to TM 11-499; Dept. of the Navy, DNC 13 ( ) series; Dept. of the Air Force, TO 16-1B-2 series.)
CRPL—F. Ionospheric Data.
*IRPL—A. Recommended Frequency Bands for Ships and Aircraft in the Atlantic and Pacific.
*IRPL—H. Frequency Guide for Operating Personnel.

Circulars of the National Bureau of Standards:

NBS Circular 462. Ionospheric Radio Propagation.
NBS Circular 465. Instructions for the Use of Basic Radio Propagation Predictions.

Reports issued in past:

IRPL—C61. Report of the International Radio Propagation Conference, 17 April to 5 May 1944.
IRPL—G1 through G12. Correlation of D. F. Errors With Ionospheric Conditions.
IRPL—R. Nonscheduled reports:
- R4. Methods Used by IRPL for the Prediction of Ionosphere Characteristics and Maximum Usable Frequencies.
- R5. Criteria for Ionospheric Storminess.
- **R6. Experimental Studies of Ionospheric Propagation as Applied to the Loran System.
- R7. Second Report on Experimental Studies of Ionospheric Propagation as Applied to the Loran System.
- R9. An Automatic Instantaneous Indicator of Skip Distance and MUF.
- R10. A Proposal for the Use of Rockets for the Study of the Ionosphere.
- **R11. A Nomographic Method for both Prediction and Observation Correlation of Ionosphere Characteristics.
- **R12. Short Time Variations in Ionospheric Characteristics.
- R14. A Graphical Method for Calculating Ground Reflection Coefficients.
- **R15. Predicted Limits for F2-Layer Radio Transmission Throughout the Solar Cycle.
- **R17. Japanese Ionospheric Data—1943.
- R18. Comparison of Geomagnetic Records and North Atlantic Radio Propagation Quality Figures—October 1943 Through May 1945.
- **R21. Notes on the Preparation of Skip-Distance and MUF Charts for Use by Direction-Finder Stations. (For distances out to 4000 km.)
- **R23. Solar-Cycle Data for Correlation with Radio Propagation Phenomena.
- **R24. Relations Between Band Width, Pulse Shape and Usefulness of Pulses in the Loran System.
- **R25. The Prediction of Solar Activity as a Basis for the Prediction of Radio Propagation Phenomena.
- R26. The Ionosphere as a Measure of Solar Activity.
- R27. Relationships Between Radio Propagation Disturbance and Central Meridian Passage of Sunspots Grouped by Distance From Center of Disc.
- **R30. Disturbance Rating in Values of IRPL Quality-Figure Scale from A. T. & T. Co. Transmission Disturbance Reports to Replace T. D. Figures as Reported.
- R31. North Atlantic Radio Propagation Disturbances, October 1943 Through October 1945.
- **R33. Ionospheric Data on File at IRPL.
- **R34. The Interpretation of Recorded Values of *fEs*.
- R35. Comparison of Percentage of Total Time of Second-Multiple *Es* Reflections and That of *fEs* in Excess of 3 Mc.

IRPL—T. Reports on tropospheric propagation:
- T1. Radar operation and weather. (Superseded by JANP 101.)
- T2. Radar coverage and weather. (Superseded by JANP 102.)

CRPL—T3. Tropospheric Propagation and Radio-Meteorology. (Reissue of Columbia Wave Propagation Group WPG—5.)

*Items bearing this symbol are distributed only by U. S. Navy. They are issued under one cover as the DNC 14( ) Series.
**Out of print; information concerning cost of photostat or microfilm copies is available from CRPL upon request.